KONGU ENGINEERING COLLEGE, PERUNDURAI, ERODE – 638 052
(Autonomous)

B.E. DEGREE IN COMPUTER SCIENCE AND ENGINEERING

CURRICULUM

(For the candidates admitted from academic year 2014 – 15 onwards)

SEMESTER – I

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14EGT11	Communicative English I	3	0	0	3	40	60	100
14MAT11	Mathematics I	3	1	0	4	40	60	100
14PHT11	Applied Physics	3	0	0	3	40	60	100
14CYT11	Applied Chemistry	3	0	0	3	40	60	100
14CSC11	Problem Solving and Programming	3	0	3	4	40	60	100
14EET11	Basics of Electrical and Electronics Engineering	3	0	0	3	40	60	100
	PRACTICAL							
14PHL11	Physical Sciences Laboratory I	0	0	3	1	100	0	100
14EEL11	Basics of Electrical and Electronics Engineering Laboratory	0	0	3	1	100	0	100
				Total	**22**			

CA – Continuous Assessment, ESE – End Semester Examination

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B.E. DEGREE IN COMPUTER SCIENCE AND ENGINEERING

CURRICULUM

(For the candidates admitted from academic year 2014 – 15 onwards)

SEMESTER – II

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14EGT21	Communicative English II	3	0	0	3	40	60	100
14MAT21	Mathematics II	3	1	0	4	40	60	100
14PHT21	Materials Science	3	0	0	3	40	60	100
14CYT21	Environmental Science	3	0	0	3	40	60	100
14MET11	Basics of Civil and Mechanical Engineering	3	0	0	3	40	60	100
14MEC11	Engineering Drawing	2	0	3	3	40	60	100
14VEC11	Value Education	0	2	1	1	100	0	100
	PRACTICAL							
14PHL21	Physical Sciences Laboratory II	0	0	3	1	100	0	100
14MEL11	Basics of Civil and Mechanical Engineering Laboratory	0	0	3	1	100	0	100
				Total	**22**			

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B.E. DEGREE IN COMPUTER SCIENCE AND ENGINEERING

CURRICULUM

(For the candidates admitted from academic year 2014 – 15 onwards)

SEMESTER – III

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14MAT31	Mathematics III	3	1	0	4	40	60	100
14CST31	Data Structures	3	0	0	3	40	60	100
14CST32	Object Oriented Programming using C++	3	0	0	3	40	60	100
14CST33	Computer Organization	3	0	0	3	40	60	100
14CST34	Digital Logic and Verilog Programming	3	0	0	3	40	60	100
14ECT33	Communication Engineering	3	0	0	3	40	60	100
	PRACTICAL							
14CSL31	Data Structures Laboratory	0	0	3	1	100	0	100
14CSL32	Object Oriented Programming using C++ Laboratory	0	0	3	1	100	0	100
14CSL33	Digital Logic and Verilog Programming Laboratory	0	0	3	1	100	0	100
				Total	**22**			

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CURRICULUM

(For the candidates admitted from academic year 2014 – 15 onwards)

SEMESTER – IV

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14MAT43	Discrete Mathematics	3	1	0	4	40	60	100
14CST41	Database Management Systems	3	1	0	4	40	60	100
14CST42	Operating Systems	3	0	0	3	40	60	100
14CST43	Design and Analysis of Algorithms	3	1	0	4	40	60	100
14CST44	Software Engineering	3	0	0	3	40	60	100
14ITT42	Java Programming	3	0	0	3	40	60	100
	PRACTICAL							
14CSL41	Database Management Systems Laboratory	0	0	3	1	100	0	100
14CSL42	Operating Systems Laboratory	0	0	3	1	100	0	100
14ITL41	Java Programming Laboratory	0	0	3	1	100	0	100
				Total	**24**			

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B.E. DEGREE IN COMPUTER SCIENCE AND ENGINEERING

CURRICULUM

(For the candidates admitted from academic year 2014 – 15 onwards)

SEMESTER – V

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14MAT51	Probability and Queuing Theory	3	1	0	4	40	60	100
14ITT51	Computer Communication Networks	3	0	0	3	40	60	100
14ITT52	Web Technology	3	0	0	3	40	60	100
14CST51	Object Oriented System Design	3	0	0	3	40	60	100
14CST52	Theory of Computation	3	1	0	4	40	60	100
	Elective-I (Professional)	3	0	0	3	40	60	100
	PRACTICAL							
14ITL52	Web Technology Laboratory	0	0	3	1	100	0	100
14CSL51	Case Tools Laboratory	0	0	3	1	100	0	100
				Total	**22**			

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B.E. DEGREE IN COMPUTER SCIENCE AND ENGINEERING

CURRICULUM

(For the candidates admitted from academic year 2014 – 15 onwards)

SEMESTER – VI

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14GET61	Economics and Management for Engineers	3	0	0	3	40	60	100
14ITT61	Network Programming and Management	3	0	0	3	40	60	100
14CST61	Compiler Design	3	1	0	4	40	60	100
14CSC61	Graphics and Multimedia	3	0	2	4	40	60	100
	Elective-II (Professional)	3	0	0	3	40	60	100
	Elective-III (Open)	3	0	0	3	40	60	100
	PRACTICAL							
14ITL61	Network Programming Laboratory	0	0	3	1	100	0	100
14EGL41	Communication Skills Laboratory	0	0	3	1	100	0	100
14CSL61	Compiler Design Laboratory	0	0	3	1	100	0	100
				Total	**23**			

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CURRICULUM

(For the candidates admitted from academic year 2014 – 15 onwards)

SEMESTER – VII

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14GET71	Total Quality Management	3	0	0	3	40	60	100
14CST71	Machine Learning	3	1	0	4	40	60	100
14CST72	Mobile Communication	3	0	0	3	40	60	100
	Elective – IV (Professional)	3	0	0	3	40	60	100
	Elective – V (Open)	3	0	0	3	40	60	100
	Elective – VI (Open)	3	0	0	3	40	60	100
	PRACTICAL							
14CSL71	Machine Learning Algorithm Laboratory	0	0	3	1	100	0	100
14CSL72	Mobile Communication Laboratory	0	0	3	1	100	0	100
14CSP71	Mini Project	0	0	6	3	50	50	100
				Total	**24**			

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B.E. DEGREE IN COMPUTER SCIENCE AND ENGINEERING

CURRICULUM

(For the candidates admitted from academic year 2014 – 15 onwards)

SEMESTER – VIII

Course Code	Course Title	Hours / Week			Credit	Maximum Marks		
		L	T	P		CA	ESE	Total
	THEORY							
14GET81	Professional Ethics and Human Values	3	0	0	3	40	60	100
	Elective – VII (Professional)	3	0	0	3	40	60	100
	Elective – VIII (Professional)	3	0	0	3	40	60	100
	Elective – IX (Professional)	3	0	0	3	40	60	100
	PRACTICAL							
14CSP81	Project Work	0	0	18	9	100	100	200
				Total	**21**			

CA – Continuous Assessment, ESE – End Semester Examination

Total Credits: 180

LIST OF PROFESSIONAL ELECTIVES					
Course Code	**Course Title**	**Hours/Week**			**Credit**
		L	**T**	**P**	
SEMESTER V					
14MAE01	Linear Programming	3	1	0	4
14CSE01	Advanced Databases	3	0	0	3
14CSE02	Artificial Intelligence	3	0	0	3
14CSE03	Advanced Java Programming	3	0	0	3
SEMESTER VI					
14MAT41	Numerical Methods	3	1	0	4
14ITE01	Data warehousing and Data Mining	3	0	0	3
14ITE03	XML and Web Services	3	0	0	3
14ITE08	Cloud Computing	3	0	0	3
14CSE04	Natural Language Processing	3	0	0	3
14CSE05	Real time Computing and Communication	3	0	0	3
SEMESTER VII					
14ITT71	Cryptography and Network Security	3	1	0	4
14CSE06	Software Testing	3	0	0	3
14CSE07	Social Network Analysis	3	0	0	3
14CSE08	Unix Internals	3	0	0	3
14CSE09	Multicore Architecture	3	0	0	3
14CSE10	Knowledge Representation and Reasoning	3	0	0	3
14CSE11	Business Intelligence and its Application	3	0	0	3
14CSE12	Adhoc and Wireless Sensor Networks	3	0	0	3
SEMESTER VIII					
14EIE04	Soft Computing Techniques	3	0	0	3
14ITE10	Cyber Forensics	3	0	0	3
14ITE12	Building Enterprise Applications	3	0	0	3
14GEE81	Entrepreneurship Development	3	0	0	3
14CSE13	Digital Design Verification	3	0	0	3
14CSE14	Big Data Analytics	3	0	0	3
14CSE15	Semantic Web	3	0	0	3
14CSE16	Software Project Management	3	0	0	3
14CSE17	Software Quality Assurance	3	0	0	3
14CSE18	Decision Support Systems	3	0	0	3
14CSE19	Foundations of Modern Networking	3	0	0	3

LIST OF OPEN ELECTIVES					
Course Code	**Course Title**	**Hours/Week**			**Credit**
		L	**T**	**P**	
SEMESTER VI					
14CSO01	Information Security	3	0	0	3
14CSO02	Computer Modeling and Simulation	3	0	0	3
SEMESTER VII					
14CSO03	Bio inspired Computing	3	0	0	3
14CSO04	Image Processing for Computer Vision	3	0	0	3
14CSO05	Green Computing	3	0	0	3
14CSO06	Bioinformatics	3	0	0	3
14CSO07	E-Commerce	3	0	0	3
14CSO08	Essentials of Information Technology	3	0	0	3

14EGT11 COMMUNICATIVE ENGLISH I

(Common to all Engineering and Technology branches)

3 0 0 3

UNIT – I **9**

Functional Grammar: Basics of Vocabulary - Parts of speech or Word Classes including Determiners - Prefixes and Suffixes - Homonyms and Homophones - Connectives - Compound Nouns. **Listening:** Introduction to Listening / Types of Listening – Extensive / Intensive Listening - Listening Activities. **Speaking:** Verbal and non verbal communication – An introduction to speech sounds, syllables & word stress – Speaking Activities. **Reading:** Introduction to Skimming and scanning as reading techniques - understanding discourse coherence – sequencing of sentences – Reading activities. **Writing:** Introduction to aspects of technical writing – writing definitions and descriptions- Letter Writing – Informal letters-Punctuation in Letter Writing

UNIT – II **9**

Functional Grammar: Concord - Tenses - Voice - Use of Articles and prepositions. **Listening:** Listening Comprehension – Cloze Test - Extensive listening – listening for general information. **Speaking:** Role Play – Situational Conversations. **Reading:** Reading newspaper articles – global understanding skills and ability to infer, extract gist and understand main ideas. **Writing:** Letter Writing - Formal letters, Writing a Profile about an organization—Punctuation (General).

UNIT – III **9**

Functional Grammar: Phrasal verbs - Clauses - Simple, Compound and Complex Sentences - Synonyms and Antonyms. **Listening:** Listening Comprehension – Cloze Text - Intensive listening – listening for specific information. **Speaking:** Describing Places, People, Technical Processes. **Reading:** Reading different types of texts – Understanding general and specific information. **Writing:** Paragraph Writing – Writing reviews on short films and videos - Offering suggestions and recommendations

UNIT – IV **9**

Functional Grammar: Conditional clauses (If clause) - Adjectives, Compound Adjectives and Degrees of Comparison. **Listening:** Listening to different accents, listening to speeches / presentations. **Speaking:** Describing Technical Processes and Machines and Gadgets - Telephone Skills. **Reading:** Reading Texts with focus on use of verbs and verb phrases. **Writing:** Writing e-mails –Transcoding - Using Charts, pictures and tables for interpretations.

UNIT – V **9**

Functional Grammar: Modals – Types of Sentences – Idioms and Phrases and proverbs - identifying odd words. **Listening:** Retrieval of factual information – listening to identify topic, context, function, speaker's opinion, attitude, etc. **Speaking:** Interviews - Personal and Telephonic - Giving impromptu talks, making presentations on given topics. **Reading:** Reading for structure and detail – finding key information in a given text and finding topic sentences. **Writing:** Designing and Making Posters – Writing Advertisements-Free writing on any given topic (Technical and topics on current affairs)

TOTAL : 45

TEXT BOOKS :

1. Department of English, Anna University, "Mindscapes: English for Technologists and Engineers", Orient Blackswan, Chennai. 2012.

REFERENCE BOOKS :

1. Raman, Meenakshi and Sangeetha Sharma, "Technical Communication: Principles and Practice", Oxford University Press, New Delhi, 2011.
2. Regional Institute of English, "English for Engineers", Cambridge University Press, New Delhi, 2006.
3. Rizvi, Ashraf M., "Effective Technical Communication", Tata McGrawHill, New Delhi. 2009.

Course Outcomes:

On completion of the course the students will be able to

- speak clearly, confidently, comprehensibly, and communicate with others using appropriate communicative strategies
- write cohesively and flawlessly avoiding grammatical errors, using a wide range of vocabulary, organizing their ideas logically on a topic
- read different genres of texts adopting various reading strategies
- listen/view and comprehend different spoken discourses / excerpts in different accents
- use language effectively and accurately acquiring vocabulary from real-life context

14MAT11 MATHEMATICS I

(Common to all Engineering and Technology branches)

3 1 0 4

Pre-requisites: Basics concepts of matrices, Basic idea of differentiation, Knowledge of differential equations

UNIT – I **9**

Matrices: Eigenvalues and Eigenvectors of a real matrix – Properties of Eigenvalues and Eigenvectors (without proof) – Cayley-Hamilton Theorem (Statement and Applications) - Similarity transformation (concept only) – Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form – Nature of quadratic forms – Reduction of a quadratic form to canonical form by orthogonal transformation.

UNIT – II **9**

Functions of Several Variables: Functions of two variables – Partial derivatives – Total differential – Taylor's Series expansion –Maxima and Minima – Constrained maxima and minima – Lagrange's multiplier method – Jacobians – Properties.

UNIT – III **9**

Ordinary Differential Equations of First Order: Solutions of equations in separable form – Exact differential equations – Integrating factors – Linear first order differential equations – Bernoulli's equation – Clairaut's equation.

UNIT – IV **9**

Ordinary Differential Equations of Higher Order: Linear differential equations of second and higher order with constant coefficients – Particular Integrals for the types: e^{ax} – cos(ax) / sin(ax) – x^n – $e^{ax}x^n$, $e^{ax}\sin(bx)$ and $e^{ax}\cos(bx)$ – $x^n\sin(ax)$ and $x^n\cos(ax)$ – Linear differential equations with variable coefficients: Euler-Cauchy's equation – Legendre's equation.

UNIT – V **9**

Applications of Ordinary Differential Equations: Method of variation of parameters – Simultaneous first order linear equations with constant coefficients – Simple harmonic motion – Deflection of beams – Electric circuits (Differential equations and associated conditions need to be given).

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOKS:

1. Kandasamy P., Thilagavathy K. and Gunavathy K., "Engineering Mathematics For First Year B.E/B.Tech", Reprint Edition 2014, S.Chand and Co., New Delhi.
2. Veerarajan T., "Engineering Mathematics, (for first year)", Reprint Edition 2013, Tata McGraw-Hill, New Delhi.

REFERENCE BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", 42nd Edition, Khanna Publications, New Delhi, 2011.
2. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", 4th Edition, Narosa Publishing House, New Delhi, Reprint 2014.
3. Bali N.P. and Manish Goyal, "Text Book of Engineering Mathematics", 8th Edition, Laxmi Publications, New Delhi, 2011.
4. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, 2011.
5. Kreyszig E., "Advanced Engineering Mathematics", 10th Edition, John Wiley Sons, 2010.

Course Outcomes:

On completion of the course the students will be able to

- solve engineering problems which needs matrix computations
- solve extremal problems which arise in function of several variables
- identify the appropriate method for solving first order ordinary differential equations
- classify and find the solution of ordinary differential equations of higher order
- apply the concept of ordinary differential equations for modeling and finding solutions to engineering problems

14PHT11 APPLIED PHYSICS

(Common to all Engineering and Technology branches)

3 0 0 3

UNIT – I **9**

Properties of Matter: Elasticity – Hooke's law – Modulus of elasticity (qualitative) – Stress-strain diagram – Poisson's ratio – Bending moment – Depression of a cantilever (theory) – Derivation of Young's modulus of the material of the beam – Uniform and non-uniform bending – I-shaped girders. **Thermal Physics:** Modes of heat transfer – Thermal conductivity – Derivation of rectilinear flow of heat along a bar – Radial and cylindrical heat flow – Conduction through compound media (series and parallel).

UNIT – II **9**

Acoustics: Classification of sound – Weber–Fechner law – Sabine's formula- derivation using growth and decay method – Absorption coefficient and its determination –Factors affecting acoustics of buildings and their remedies. **Ultrasonics:** Production – Magnetostrictive generator – Piezoelectric generator – Determination of velocity using acoustic grating – Cavitation – Industrial applications – Drilling, welding, soldering and cleaning – Non destructive testing – Ultrasonic pulse echo system.

UNIT – III **9**

Laser and Applications: Spontaneous emission and stimulated emission – Population inversion – Pumping methods – Derivation of Einstein's coefficients (A&B) – Types of lasers – Nd:YAG laser, CO_2 laser, Semiconductor lasers: homojunction and heterojunction – Laser Applications – Industrial applications: laser welding, laser cutting, laser drilling – Holography – Construction and reconstruction of images.

UNIT – IV **9**

Fiber Optics and Applications: Principle and propagation of light through optical fibers – Derivation of numerical aperture and acceptance angle – Classification of optical fibers (based on refractive index, modes and materials) – Crucible-crucible technique for fiber fabrication – Sources (LED and LASER) and detectors (p-i-n photodiode and avalanche photodiode) for fiber optics - Fiber optical communication links – Losses in optical fibers – Fiber optic sensors – Temperature and displacement sensors.

UNIT – V **9**

Quantum Physics and Applications: Black body radiation – Planck's theory (derivation) – Compton effect (theory) – Matter waves – Uncertainty principle (qualitative) – Schroedinger's wave equations – Time independent and time dependent wave equations – Physical significance of wave function – Particle in a box (One dimensional) – Electron microscopes – Scanning electron microscope – Transmission electron microscope.

TOTAL : 45

TEXT BOOKS:

1. Tamilarasan K and Prabu K, "Engineering Physics-I", Tata McGraw Hill Education Private Limited, New Delhi, 2014.

REFERENCE BOOKS:

1. Gaur R.K. and Gupta S.L., "Engineering Physics", Dhanpat Rai and Sons, New Delhi, 2009.
2. Uma Mukherji, "Engineering Physics", Narosa Publishing House, New Delhi, 2011.
3. Laud B.B., "Lasers and non- linear optics", New Age International (p) Limited Publishers, New Delhi, 1996.
4. Ajoy Ghatak and Thyagarajan K., "Introduction to Fiber Optics", Cambridge University Press, New York, USA, 2000
5. Mehta and Neeraj, "Applied Physics for Engineers", Prentice-Hall of India Private Limited, New Delhi, 2011.
6. Douglas Brandt and Douglas C. Giancoli, "Physics for Scientists and Engineers", Prentice-Hall of India Private Limited, New Delhi, 2000.

Course Outcomes:

On completion of the course the students will be able to

- infer the extensive properties of matter and heat conduction in metal
- demonstrate acoustically good buildings and non destructive testing using ultrasonic waves
- employ the laser in engineering and technology
- sketch the principle of fiber optic concepts and fiber optic communication link
- apply the concepts of quantum physics to optical phenomena and electrons in a metal

14CYT11 APPLIED CHEMISTRY

(Common to all Engineering and Technology branches)

3 0 0 3

UNIT – I **9**

Water: Introduction - Sources of water - Impurities in water - Types of water - Water quality standards - Water quality parameters (Brief discussion only) - Hardness of water- Expression of hardness - Units of hardness –Estimation of Hardness of water by EDTA method – Determination of alkalinity - Disadvantages of using hard water - Boiler troubles due to hard water - scale and sludge formation – boiler corrosion – caustic embrittlement- priming and foaming- Softening of water- External treatment methods - zeolite and demineralization process (principle, process, advantages and disadvantages only) - Internal treatment process - colloidal, carbonate, calgon and phosphate conditioning (brief discussion only) - desalination by reverse osmosis method

UNIT – II **9**

Electrochemistry: Introduction – Electrolytic and Electrochemical Cells – Representation of a galvanic cell - Reversible and Irreversible cells - EMF and its determinations – Electrode potential - Nernst Equation – Reference electrodes (hydrogen and calomel electrodes) – Electrochemical series and its applications – Conductometric titrations (strong acid vs strong base only) - Batteries (Lead Acid battery, NICAD, Lithium battery, Lithium Sulphur battery) – Proton exchange membrane cells.

UNIT – III **9**

Corrosion and Its Control: Introduction – Mechanism of chemical and electrochemical corrosion – galvanic corrosion - concentration cell corrosion – Galvanic series - Factors influencing rate of corrosion – corrosion control methods - Sacrificial anode and impressed current cathodic protection methods – Corrosion inhibitors - Protective coatings - classifications - Pretreatment of metal surface - Metallic coating -electroplating and electrolessplating (General discussion) - Hot dipping (Tinning and galvanising) - Non-metallic coating - surface conversion coating (phosphate coating and anodized coating) - Organic coating - paints – constituents and their function – Special paints (Fire retardant, temperature indicating, water repellant and luminescent paints)

UNIT – IV **9**

Fuels: Coal and its varieties – proximate and ultimate analysis – their significance – metallurgical coke - Otto-Hoffman byproduct method - Liquid fuel - refining of petroleum – Manufacture of synthetic petrol – Cracking - Polymerization - Hydrogenation of coal (Fisher Tropsch and Bergius methods) - knocking - octane number – improving octane number by additives – Diesel – cetane number – Gaseous fuels (Water gas and LPG).

Combustion: Introduction – Calorific Values – Gross and Net Calorific Values – Dulong's formula (simple problems)- Flue gas analysis by Orsat's method - Explosive range and Spontaneous Ignition Temperature

UNIT – V **9**

Polymers: Introduction – Nomenclature of polymers – functionality – polymerization - types – addition, condensation and co-polymerization with examples – Effect of polymer structure on properties (strength, plastic deformation, glass transition temperature and melting point of polymers (Tg and Tm), crystallinity and chemical resistance) - plastics – types (thermo and thermosetting plastics) - individual polymers - Polyethylene, Polypropylene, PVC, Teflon and Bakelite (preparation, properties and uses only) - Compounding of plastics- Fabrication of plastics (compression, injection and extrusion moulding methods) – conducting polymers

TOTAL : 45

TEXT BOOKS:

1. Palanisamy P.N, Geetha A, Manjula Rani K, "Applied Chemistry", 2nd Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2013.
2. Jain P C and Monica Jain, "Engineering Chemistry", 15th Edition, Dhanpat Rai Publication Co., New Delhi, 2008.

REFERENCE BOOKS:

1. Sharma B.K., "Engineering Chemistry", Krishna Prakasan Media (P) Ltd., Meerut, 2001.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill, New Delhi, 2008.
3. Krishnamurthy N., "Engineering Chemistry", 2nd Edition, PHI Learning Private Limited, New Delhi, 2008.

Course Outcomes:

On completion of the course the students will be able to

- get the basic knowledge of water quality parameters and treatment methods
- obtain the principles of electrochemical cells, EMF series and energy storing devices
- acquire the knowledge of the types and prevention methods of corrosion
- know the concepts and developments in combustion and various types of fuels
- understand the knowledge about the types of polymers, plastics and moulding methods

14CSC11 PROBLEM SOLVING AND PROGRAMMING

(Common to all Engineering and Technology branches)

3 0 3 4

UNIT – I **9**

Introduction to Computer and Problem Solving: Overview of computers – Applications of computers-Characteristics of computer - Basic computer Organization – Number System - Problem solving: Planning the computer program – Algorithms - Flowcharts – Pseudo codes – Structuring the logic - Top-Down design.

UNIT – II **9**

Case Study on Problem Solving: Algorithm, Flowchart and Pseudo code for the problems: Exchanging the values of two variables – Finding the biggest number - Counting – Summation of numbers – Factorial computation – Generation of Fibonacci Sequence - Summation of series – Base Conversion - Reversing the digits of an Integer.

UNIT – III **9**

Introduction to C and Control Statements: Overview of C – Basic structure of a C Program – Executing a C Program – C Character set – Tokens – Keywords and Identifiers – Constants – Variables – Data types - Storage classes - Managing Input and Output operations – Operators and Expressions - Decision making and Branching - Looping – break and continue statements.

UNIT – IV **9**

Arrays, Strings and Functions: Arrays – One dimensional and Two dimensional arrays - Handling of character strings: Declaring and initializing string variables – String handling functions - Library functions – User defined functions: Elements of User defined Functions – nesting of functions – passing arrays to function – passing strings to functions - recursion.

UNIT – V **9**

Structures, Unions and Pointers: Structure definition – Structure declaration – Accessing a structure member- Structure initialization – Array of Structures - Arrays within structures –Structures within Structures – Structures and Functions , Unions. Understanding pointers – Accessing address of a variable – Declaring pointer variables – Initialization of pointer variables – accessing a variable through its pointer – Pass by value vs. Pass by pointers.

Lecture: 45, Practical: 45, TOTAL: 90

REFERENCE BOOKS:

1. Dromey R.G., "How to Solve it by Computer", Pearson Education, 2009.
2. Balagurusamy E., "Fundamentals of Computing and Programming", Tata McGraw-Hill Education Pvt. Ltd, 2010.
3. Stephen G. Kochan, "Programming in C", 3rd Edition, Pearson Education, 2005.
4. Yashavant P. Kanetkar, " Let Us C", BPB Publications, 2011.

Course Outcomes:

On completion of the course the students will be able to

- apply fundamental principles of problem solving techniques
- develop algorithm, flowchart and pseudo code to provide solutions to problems
- develop programs using basic programming principles of C language
- implement modular programming concepts using functions
- design simple applications using arrays, structures and pointers

14EET11 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to all Engineering and Technology branches)

3 0 0 3

UNIT- I **9**

Introduction to Power Systems: Introduction: Electric Potential, Current, Power and Energy. Generation of Electrical Energy: Sources of Energy - Renewable and Non Renewable - Power Generation: Thermal, Hydro and Nuclear Power plants - Solar and Wind (schematic arrangement and operation) Power plants - Structure of Electric Power System - Transmission and Distribution Voltages. Electrical Safety Aspects - Phase-Neutral - Earthing: Need for Earthing and Types - Domestic Wiring (Simple and staircase) - Energy Conservation and Sustainability.

UNIT - II **9**

DC Circuits and AC Circuits: Resistance: Resistors in Series and Parallel - Network Reduction - Voltage and Current Division Rule - Ohm's Law- Kirchhoff's Laws - Mesh Analysis of Simple Resistive Networks.

Single phase systems: Alternating (Sinusoidal) Voltage and Current, R.M.S and Average Value, Power Factor, Form Factor and Peak Factor - AC Series Circuits (RL, RC & RLC). Three phase Systems (Qualitative only): Star and Delta Connected Systems - Line and Phase Voltage/Current - Three Phase Power Measurement by Two Wattmeter Method.

UNIT - III **9**

Electrical Machines: DC Machines: Construction, Principle of Operation of DC Motor-Torque Equation, Types and Applications. AC Machines: Construction and Working Principle of AC Generator , Single Phase Transformer, Three Phase Induction Motor and Single Phase Induction Motor (Split Phase and Capacitor Start Induction Motor) - Applications.

UNIT - IV **9**

Basic Electronics: PN Junction Diode - Operation of Rectifiers (Half wave, Full wave - Bridge Rectifiers with waveforms) and Filters - Zener Diodes - Zener Diode as Voltage Regulator - IC Voltage Regulators (78XX & 79XX) - Transistors: Types - Operation of NPN Transistor - Transistor as an Amplifier - Operation and Characteristics of SCR - UPS and SMPS (Block Diagram approach).

UNIT - V **9**

Digital Electronics: Introduction – Binary Number Systems and Conversions - Binary Addition and Subtraction - Logic Gates and Truth tables - Boolean Algebra - Basic Laws and Demorgan's theorem - Simplification of Boolean Functions - Full Adder and Full Subtractor - Flip Flops - Counters: Asynchronous Binary Ripple Counter .

TOTAL: 45

TEXT BOOKS:

1. Prasad P.V., Sivanagaraju S. and Prasad R., "Basics of Electrical and Electronics Engineering", 1st Edition, Cengage Learning, 2013.
2. Muthusubramanian R. and Salivahanan S., "Basics of Electrical and Electronics Engineering", 1st Edition ,Tata McGraw Hill, 2009.

REFERENCE BOOKS:

1. Jegathesan V., Vinoth Kumar K. and Saravanakumar R., "Basic Electrical and Electronics Engineering", 1st Edition, Wiley India, 2011.
2. Sukhija M.S. and Nagsarkar T.K., "Basics of Electrical and Electronics Engineering", 1st Edition ,Oxford University Press, 2012.
3. Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2nd Edition, PHI Learning, 2007.
4. Edward Hughes, Ian McKenzie Smith, Dr. John Hiley and Keith Brown, "Electrical and Electronics Technology", 8th Edition, Pearson Education, 2012.

Course Outcomes:

On completion of the course the students will be able to

- develop a basic understanding of the concept of electrical systems
- analyze the DC and AC circuits
- interpret the construction and working of different types of electric machines
- discuss the basic electronic components
- distinguish analog and digital electronics

14PHL11 PHYSICAL SCIENCES LABORATORY I

(Common to all Engineering and Technology branches)

0 0 3 1

PART-A: APPLIED PHYSICS LABORATORY

(Any five experiments)

LIST OF EXPERIMENTS:

1. Determination of Young's modulus of a given material using uniform bending.
2. Determination of thermal conductivity of bad conductor using Lee's disc arrangement.
3. Determination of velocity of ultrasonic waves in liquid and compressibility of liquid using ultrasonic interferometer.
4. (a) Particle size determination using diode laser.

   (b) Determination of wavelength of laser
5. Determination of specific resistance of a given coil of wire using Carey Foster bridge.
6. Determination of wavelength of Hg spectrum using spectrometer and grating.

Demonstration

1. Measurement of efficiency of a solar cell
2. Non destructive testing
3. Tyndall effect

PART-B: APPLIED CHEMISTRY LABORATORY

(Any five experiments)

LIST OF EXPERIMENTS:

1. Estimation of Total, Temporary and Permanent hardness of water by EDTA method.
2. Estimation of Ca^{2+} and Mg^{2+} hardness separately by EDTA method.
3. Estimation of Alkalinity of the given water sample.
4. Conductometric titration - Mixture of acids.
5. Estimation of Hydrochloric acid using pH meter.
6. Estimation of Ferrous ion by potentiometric titration.

Demonstration

1. Distillation system
2. RO water treatment system
3. UV Spectrophotometer

REFERENCES / MANUALS / SOFTWARE:

1. Physics Laboratory Manual –Dr.K.Tamilarasan and Dr.K.Prabu
2. Chemistry Laboratory Manual- Dr.P.N.Palanisamy, P.Manikandan, A.Geetha and K.Manjularani

TOTAL : 45

Course Outcomes:

On completion of the course the students will be able to

- describe the basics of modulus of elasticity, thermal conductivity, ultrasonics and compressibility of water, laser parameters, specific resistance of electrical conductors, and interference and diffraction of light waves.
- operate basic measuring devices, travelling microscope, Lee's disc arrangement, ultrasonic interferometer, Carrey Foster bridge and spectrometer, and to measure the related physical parameters.
- estimate the hardness, amount of Ca^{2+} and Mg^{2+} ions and presence of alkalinity in water
- employ instruments like pH meter, conductivity meter and potentiometer for the estimation of unknown concentration of acids and ferrous ion.

14EEL11 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

(Common to all Engineering and Technology branches)

0 0 3 1

LIST OF EXPERIMENTS:

1. Control of incandescent and fluorescent lamp by simple and stair-case wiring
2. Resistor color coding and verification of Ohm's Law and Kirchhoff's Laws
3. Measurement of real power, reactive power, power factor and impedance of RC, RL and RLC circuits.
4. Measurement of Earth's resistance
5. Load test on DC shunt motor
6. Performance characteristics of single phase Transformer
7. Load test on single phase induction motor.
8. Verification of basic logic gates and their truth tables.
9. Implementation of Half wave and Full wave Rectifier with simple Capacitor Filter
10. Study of Mixie, Ceiling Fan and Vacuum Cleaner

TOTAL : 45

REFERENCES / MANUALS / SOFTWARE:

- Lab Manuals

Course Outcomes:

On completion of the course the students will be able to

- create a basic electrical connections for domestic applications
- test basic electrical machines like transformer and DC motors
- construct and analyze basic electronic circuits
- measure the various electrical parameters of the circuit
- explain the working of various domestic appliances

14EGT21 COMMUNICATIVE ENGLISH II

(Common to all Engineering and Technology branches)

3 0 0 3

UNIT – I **9**

Functional Grammar: Sentences – Affirmative / Negative – Asking questions in the simple present – Using reference words - Cause and Effect expressions. **Listening:** Listening practice - listening to different types of conversation and answering questions - listening to Audio texts and completing cloze exercises. **Speaking:** Opening a conversation and getting acquainted with people. **Reading:** Reading excerpts from a novel, itinerary, magazine and news paper articles. **Writing:** Formal Letter writing – Job Application Letter – CV and Resume – Writing Instructions

UNIT – II **9**

Functional Grammar: Sentences – Interrogative & WH questions - SI units – Numerical Adjectives **Listening:** Listening to situation based dialogues – listening to short and long conversations in different domains of activity. **Speaking** : Conversation practice in real life situations, describing places, narration, introducing ideas. **Reading:** Reading historic writing – biographical writing – Non fictional book extracts and news feeds. **Writing:** Filling Forms – Academic Writing - Basics of Business Writing – Calling for Quotation, Placing Orders, Letter of Complaint

UNIT – III **9**

Functional Grammar: Sentences – Imperative – Gerunds & Infinitives - Commonly confused words. **Listening:** Understanding the structure of conversations - Listening to academic lectures and live speech – advertisements and announcements. **Speaking:** Giving and Justifying opinions – apologizing – extempore. **Reading:** Reading Blogs - Website articles – e-mails. **Writing:** e-mails – Tweets – Texting and SMS language

UNIT – IV **9**

Functional Grammar: Transformation of Sentences – Simple, Compound and Complex - Vocabulary (single word substitute) – conjunctions - reporting verbs – Direct and Indirect speech. **Listening:** Listening to a telephone conversation, viewing of model interviews (face–to–face, telephonic and video conferencing). **Speaking:** Giving instructions – Role play – Interviews. **Reading:** Reading job advertisements and profile of the company concerned **Writing:** Writing Reports - Preparing a Check list

UNIT – V **9**

Grammar: Analyzing sentence structures in a given short passage - Identifying parts of speech in a given short passage. **Listening:** Viewing a model group discussion and reviewing the performance of each participant – identifying the characteristics of a good listener – casual conversation. **Speaking:** Group discussion skills – initiating, turn taking and concluding the discussion. **Reading:** Making notes from long passages or any form of written materials – providing a suitable title – identifying main points, supporting points. **Writing:** Email writing – Effective use of email.

TOTAL: 45

TEXT BOOKS :

1. Dr. Elango et al. "Resonance: English for Engineers and Technologists", Foundation, Chennai, 2013.

REFERENCE BOOKS:

1. Anderson, Paul V., " Technical Communication **:** A Reader–Centered Approach", Cengage.
2. Muralikrishna and Sunita Mishra, "Communication Skills for Engineers", Pearson, New Delhi, 2011.
3. Sharma, Sangeetha and Binod Mishra, "Communication Skills for Engineers and Scientists", PHI Learning, New Delhi, 2009.

Course Outcomes:

On completion of the course the students will be able to

- speak effectively, express their opinions clearly, initiate and sustain a discussion and also negotiate using appropriate communicative strategies
- write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing
- read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation
- listen and comprehend different spoken excerpts critically and infer unspoken and implied meanings
- use functional grammar for improving employment oriented skill

14MAT21 MATHEMATICS II

(Common to all Engineering and Technology branches)

3 1 0 4

Pre-requisites: Basic ideas of integration, Basic ideas of vectors and complex numbers

UNIT – I **9**

Multiple Integrals: Double integration in Cartesian coordinates – Change of order of integration – Area between two curves – Triple integration in Cartesian coordinates –Volume as Triple integrals (Simple problems only).

UNIT – II **9**

Vector Calculus: Gradient of a scalar point function – Directional derivative – Divergence of a vector point function – Curl of a vector – Irrotational and Solenoidal vectors – Line Integral, Surface integral and Volume integral (Concept only) – Green's, Stoke's and Gauss divergence theorems (Statement only) – Verification of the above theorems and evaluation of integrals using them (Simple problems only).

UNIT – III **9**

Analytic Functions: Functions of a complex variable – Analytic functions – Necessary conditions and Sufficient conditions (excluding proofs) – Cauchy– Riemann equations (Statement only) – Properties of analytic function (Statement only) – Harmonic functions – Construction of Analytic functions – Conformal mapping: $w = z + a$, az, $1/z$ – Bilinear transformation.

UNIT – IV **9**

Complex Integration: Cauchy's theorem and Cauchy's integral formula (Statement and applications) – Taylor's and Laurent series – Singularities – Classification – Cauchy's Residue theorem (Statement only) – Contour integration – circular and semi-circular contours (excluding poles on real axis).

UNIT – V **9**

Laplace Transform: Conditions for existence – Transform of elementary functions – Basic properties – Derivatives and integrals of transforms – Transforms of derivatives and integrals – Initial and final value theorems – Transform of unit step function – Transform of periodic functions - Inverse Laplace transform of elementary functions – Partial fraction method – Convolution theorem (Statement only) – Solution of linear ODE of second order with constant coefficients.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOKS:

1. Kandasamy P., Thilagavathy K. and Gunavathy K., "Engineering Mathematics For First Year B.E/B.Tech", Reprint Edition 2014, S.Chand and Co., New Delhi.
2. Veerarajan T., "Engineering Mathematics", (for first year), Reprint Edition 2013, Tata McGraw-Hill, New Delhi.

REFERENCE BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", 42nd Edition, Khanna Publications, New Delhi, 2011.
2. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", 4th Edition, Narosa Publishing House, New Delhi, Reprint 2014.
3. Bali N.P. and Manish Goyal, "Text Book of Engineering Mathematics", 8th Edition, Laxmi Publications, New Delhi, 2011.
4. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, 2011.
5. Kreyszig E., "Advanced Engineering Mathematics", 10th Edition, John Wiley Sons, 2010.

Course Outcomes:

On completion of the course the students will be able to

- solve problems involving double and triple integrals
- apply the concept of vectors in engineering problems
- have a clear idea about functions of complex variables and analytic function which are widely used in study of fluid and heat flow problems
- evaluate complex integrals which are extensively applied in engineering
- handle Laplace transforms to solve practical problems

14PHT21 MATERIALS SCIENCE

(Common to all Engineering and Technology branches)

3 0 0 3

UNIT – I **9**

Crystal Physics: Crystalline and amorphous solids – Lattice – Unit cell – Crystal systems – Bravais lattice – Lattice planes – Miller indices – Derivation of '*d*' spacing in cubic lattice – Atomic radius – Coordination number– Packing factor for SC, BCC, FCC and HCP structures – Crystal imperfections: Point and line imperfections.

UNIT – II **9**

Conducting Materials: Conductors – Classical free electron theory of metals – Electrical and thermal conductivities – Wiedemann–Franz law – Lorentz number – Draw backs of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi function – Density of energy states – Carrier concentration in metals.

UNIT – III **9**

Semiconducting Materials: Intrinsic semiconductor – Carrier concentration derivation – Electrical conductivity and band gap (theory) – Extrinsic semiconductors – Carrier concentration derivation in n-type and p-type semiconductors – Hall effect – Determination of Hall coefficient – Applications – Solar cell – LDR.

UNIT – IV **9**

Magnetic and Superconducting Materials: Magnetic materials - Types of magnetic materials (qualitative) – Domain theory – Hysteresis – Soft and hard magnetic materials – Applications - Transformer core – Magneto optical recording – Superconductors – Properties – Types of superconductors – BCS theory of superconductivity (qualitative) – Josephson effect - Applications of superconductors – SQUID – Cryotron – Magnetic levitation. **Dielectric Materials:** Dielectric constant – Qualitative study of polarization – Frequency and temperature dependence of polarization – Dielectric loss – Dielectric breakdown – Uses of dielectric materials (capacitor) – Ferro electric materials (qualitative).

UNIT – V **9**

Smart Materials: Metallic glasses: Preparation (Melt spinning method only), properties and applications – Shape memory alloys (SMA): Characteristics and applications. **Nano Materials:** Low dimensional structures (quantum dot, wire and well) – Features of nano materials – Synthesis: top down and bottom up approaches – Ball milling and lithographic methods – Physical and chemical vapor phase depositions – Sol gel method – Carbon nanotubes: Structures – Properties – Fabrication by laser ablation – Applications.

TOTAL : 45

TEXT BOOKS:

1. Tamilarasan K. and Prabu K., "Engineering Physics-II", Tata McGraw Hill Education Private Limited, New Delhi, 2014.

REFERENCE BOOKS:

1. Mehta and Neeraj, "Applied Physics for Engineers", Prentice-Hall of India Private Limited, New Delhi, 2011.
2. Raghavan V., "Materials Science and Engineering: A first course", 5th Edition, Prentice-Hall of India, New Delhi, 2009.
3. Poole Charles P. and Ownen Frank J., "Introduction to Nanotechnology", Wiley India, 2007.
4. William Fortune Smith and Javad Hashemi, "Foundations of Materials Science and Engineering", McGraw-Hill Education, 2006, New Delhi.
5. Pillai S.O., "Solid State Physics", 5th Edition, New Age International, New Delhi, 2003.

Course Outcomes:

On completion of the course the students will be able to

- explain the various crystal systems and crystal defects
- comprehend the theory of conducting materials
- classify the types of semiconducting materials and illustrate the device applications
- summarize the theory and applications of magnetic, superconducting and dielectric materials
- outline the properties and applications of smart materials and nano materials

14CYT21 ENVIRONMENTAL SCIENCE

(Common to all Engineering and Technology branches)

3 0 0 3

UNIT – I **9**

Introduction to Environmental Studies and Natural Resources: Introduction to Environmental Science – Forest resources: Use and over-exploitation, deforestation, case studies. – Water resources: Use and over-utilization of surface and ground water, dams - benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture - effects of modern agriculture, fertilizer and pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies – Land resources: Land as a resource – Conservation Practices - Role of an individual in conservation of natural resources.

UNIT – II **9**

Ecosystems: Concept of an ecosystem – Components of an ecosystem - Structural and functional features – Functional attributes (Food chain and Food web only) –Ecological Succession- Introduction, types, characteristic features, structure and functions of the (a) Forest ecosystem (b) Aquatic ecosystems (ponds, rivers and oceans). **Biodiversity:** Introduction – Classification: genetic, species and ecosystem diversity – Bio geographical classification of India- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic, option values and ecosystem service value – Biodiversity at global, national and local level- Hotspots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – In-situ and Ex-situ conservation of biodiversity.

UNIT – III **9**

Environmental Pollution: Definition – Causes, effects and control measures of: (a) Air pollution - Climate change, global warming, acid rain, ozone layer depletion (b)Water pollution (c) Soil pollution - Solid waste Management - Disaster management: floods, earthquake, cyclones and landslides - Role of an individual in prevention of pollution - Case studies. **Water Treatment methods:** Treatment of Water for Domestic Supply (Screening, Aeration, Sedimentation with Coagulation, Filtration and Disinfection methods) - Break point chlorination- Estimation of dissolved oxygen, BOD and COD - Sewage treatment (Primary, Secondary & Tertiary methods) – Introduction to industrial wastewater treatment using Reverse Osmosis Technology- Membrane Technology for wastewater treatment - Activated carbon in pollution abatement of wastewater.

UNIT – IV **9**

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation– Environmental ethics - Wasteland reclamation – Environment Production Act – Air (Prevention and control of pollution) Act – Water (Prevention and control of pollution) Act – Wildlife protection Act – Forest conservation Act – Issues involved in enforcement of environmental legislation – Public awareness. **Human Population and the Environment:** Introduction - Population growth - Variation of population based on age structure - Variation among nations – Population explosion – Family welfare programme – Value Education – HIV / AIDS – Women and Child welfare – Role of Information Technology in Environment and human health – Case studies.

UNIT – V **9**

Green Chemistry for Sustainable Future: Water the greenest solvent – Role of catalyst – Biopolymers – Biofertilizers – Principle and applications of green chemistry. **Food and Human Health:** Introduction – Classification and applications of carbohydrates, amino acids, proteins, lipids and vitamins – Food additives – Balanced food – Minerals rich, carbohydrates rich and proteins rich – Chemistry of soft drinks – Oils and fats – Simple tests for identification of adulterants in food stuffs – Impacts of fluoride and arsenic on human health – Fluoride and arsenic removal methods – Significance of iodine, iron and calcium content in human health.

TOTAL : 45

TEXT BOOKS:

1. Palanisamy P.N., Manikandan P., Geetha A., Manjula Rani K., “Environmental Science”, Pearson Education, New Delhi, Revised Edition 2014.
2. Anubha Kaushik, and Kaushik C.P., “Environmental Science and Engineering”, 4th multicolour Edition, New Age International (P) Ltd., New Delhi, 2014.

REFERENCE BOOKS:

1. Erach Bharucha, “Textbook of Environmental Studies for Undergraduate Courses”, 2005, University Grands Commission, Universities Press India Private Limited, Hyderguda, Hyderabad.
2. Uppal M.M. revised by Bhatia S.C., “Environmental Chemistry”, 6th Edition, Khanna Publishers, New Delhi, 2002.
3. Bahl B.S. and Arun Bahl, “Advanced Organic Chemistry”, 31st Edition, S. Chand & Co., New Delhi, 2005.

Course Outcomes:

On completion of the course the students will be able to

- know the types of natural resources and the individual role in conserving the resources
- understand the ecological balance and the preservation of bio-diversity
- gain the knowledge of the various types of pollution and the wastewater treatment methods
- attain the knowledge of various social issues and impact of population explosion on environment
- know about the green chemistry for sustainable future, food and human health

14MET11 BASICS OF CIVIL AND MECHANICAL ENGINEERING

(Common to all Engineering and Technology branches) **3 0 0 3**

PART-A: CIVIL ENGINEERING

UNIT – I **5**

Introduction: History of civil engineering - Role and Functions of civil engineer - Fields of civil engineering

UNIT– II **5**

Building Materials: Introduction – Properties and applications of Construction Materials – bricks – stones – sand – cement – mortar- concrete – steel – glass-wood –plastics- ceramics -rubber- FRP – Non ferrous materials - Geosynthetics – Smart materials.

UNIT – III **4**

Sub Structure: Soil **–** classification- bearing capacity- foundation -function- requirements- types- failures -remedial measures- machine foundation

UNIT – IV **4**

Super Structures: Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering- damp proofing- weathering course

UNIT – V **4**

Interior design and Landscaping: History of Interior design-Importance of Interior design- Basic elements of Interior design. Landscape Architecture-Elements of Landscaping- Green Engineering

PART-B: MECHANICAL ENGINEERING

UNIT – I **5**

Thermal Science: Laws of thermodynamics and their applications – Principle of operation of Steam, Diesel, Hydro-electric and Nuclear power plants - Classification of internal combustion engines and their working principles – Components of basic Vapour Compression Refrigeration system.

UNIT – II **4**

Fluid Science: Properties of fluids – Classification of hydraulic turbines, working principle of Pelton turbine – Applications of steam and gas turbines. Classification of pumps, working principle of centrifugal and reciprocating pump

UNIT – III **4**

Mechanics and Materials: Classification of engineering materials - Mechanical properties of engineering materials- Definition and importance of stress and strain - Definition and importance of centre of gravity and moment of inertia.

UNIT – IV **5**

Mechanical Components And Their Applications: Basic principles and applications of power transmission systems such as belt, rope, chain and gear drives – Function and principles of coupling, clutch, brake, flywheel and governor

UNIT – V **5**

Manufacturing Technology: Principle and applications of Metal forming process – Foundry, Forging. Principle and applications of Metal Joining process – Welding, Soldering and Brazing, Basics of CAD/CAM/CIM.

TOTAL : 45

TEXT BOOKS:

1. Palanichamy M.S., "Basic Civil Engineering", Tata McGraw-Hill, New Delhi, 2006.
2. Pravin Kumar, "Basic Mechanical Engineering", Pearson Publishers, New Delhi, 2013.

REFERENCE BOOKS:

1. Rangawala S.C., "Engineering Materials" Charotor Publishing House(P) Ltd., Anand, 2013.
2. Punmia B.C., Ashok Kumar Jain, Arun Kumar Jain, "Building Construction," Laxmi Publications (P) Ltd., NewDelhi, 2005.
3. Shanmugam G., "Basic Mechanical Engineering", Tata McGraw-Hill, New Delhi, 2005.
4. Venugopal K. and Prabhu Raja V., "Basic Mechanical Engineering", 6[th] Edition, Anuradha Publishers, Kumbakonam, 2005.

Course Outcomes:

On completion of the course the students will be able to

- select the suitable materials and components required for building construction
- demonstrate an understanding of basic concepts in thermal engineering
- demonstrate an understanding of basic concepts in fluid mechanics and fluid machines
- demonstrate an understanding of basic concepts in engineering mechanics and materials
- demonstrate an understanding of principles and applications of different mechanical components
- demonstrate an understanding of principles and applications of various manufacturing process

14MEC11 ENGINEERING DRAWING

(Common to all Engineering and Technology branches)

2 0 3 3

Pre-requisites: Basic knowledge in practical geometry construction and mathematics

UNIT – I **9**

General Principles of Orthographic Projection: Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning. Projections of Points, Lines and Planes. General principles of orthographic projection – First angle projection – Layout of views – Projection of points, located in all quadrant and straight lines located in the first quadrant – Determination of true lengths and true inclinations and location of traces – Projection of polygonal surface and circular lamina inclined to both reference planes.

UNIT – II **9**

Projections of Solid: Projections of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT – III **9**

Sectioning of Solids: Sectioning of solids- prisms, pyramids, cylinder and cone in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – Obtaining true shape of section.

UNIT – IV **9**

Development of Surfaces: Development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinders and cone with cutout, perpendicular and inclined to the horizontal axis.

UNIT – V **9**

Isometric and Perspective Projection: Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones Conversion of isometric projection into orthographic projection. Perspective projection of prisms, pyramids and cylinders by visual ray method.

TOTAL : 45

TEXT BOOKS:

1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw-Hill, New Delhi, 2008.
2. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, New Delhi, 2008.

REFERENCE BOOKS:

1. Bhatt N.D., "Engineering Drawing", 46th Edition, Charotar Publishing House, Anand, 2003.
2. Gopalakrishnana K.R., "Engineering Drawing", Volume. I & II, Subhas Publications, Bangaluru, 2006.
3. Dhananjay A. Jolhe, "Engineering Drawing with an introduction to AutoCAD", Tata McGraw Hill, New Delhi, 2008.

Course Outcomes:

On completion of the course the students will be able to

- represent the skills through graphical communication
- gain knowledge on International standards of drawings
- draw the different types of projections for points, lines and planes
- draw the different positions of 3D primitive objects like cube, cone cylinder, etc.
- draw the isometric and perspective projections for the given object

14VEC11 VALUE EDUCATION

(Common to all Engineering and Technology branches)

0 2 1 1

UNIT – I **6**

Philosophy of Life Science: Life – Purpose of life (four stages of life) – Philosophy of life (who am 'I') – Law of nature (cause of the life and body) – Content of the Life (five sheaths) – Goal of life. Five duties in life.

Methodology: Life and messages of spiritual and national leaders– The forgotten hero, etc.

Project report: Complementing with happiness - Every soul is potentially divine

UNIT – II **6**

Human Values-Moral foundation: Truth, forgiveness, compassion, endurance, humility, non violence, moderate diet, non stealing, self purification, self discipline, self study, content, cleanliness, honesty, and totality in faith– Good habits – Attitude forming for Individual peace.

Practical Methods: Personal experience with above characters, Puranic Stories - Self resolve diary maintenance

UNIT – III **6**

Social Values: Family – Family System - Greatness of women – World brotherhood (vasudeiva kudumbagam) – Glorious Bharath - Bharathian systems - Past –Present – Future - Team spirit - Goal setting – Economics – Education – Politics – Responsibilities of people – Preserving natural resources.

Methodology: Preparing an album on glorious Bharath Past, Present and Future Plans. Goal setting - Management Games. Team Spirit - Yogic Games.

UNIT – IV **6**

Development of Mental Prosperity: Prosperity of mind – Functions of mind - Obstacles of mind - Practical method to perfect mind is yoga – Types – Uses – Precaution – Contradiction – Kriyas - Asanas – Pranayamas – Meditative techniques.

Methodology: Asana - Pranayama – Cyclic meditation – Nada anu sandhana – Meditation – Yogic games for memory. Album on asanas , pranayama and mantra.

UNIT – V **6**

Maintenance of Physical Health: Human body – Structure - Ten Systems of the body as per modern science. Five elements - Harmonious relationship – Life force – Conserving vitality & health through natural life – Pranic food and its importance – Uses of herbs - Right way of cooking to preserve nutrients - Cause of the disease – Acute and chronic - Disease - Life and death.

Methodology: Natural food making, traditional millet dishes. Asanas, pranayamas, cleansing procedures, Quiz on healthy living, Uses of herbs or kitchen garden.

TOTAL : 30

TEXT BOOK:

1. "Value Education", compiled by Vethathiri Maharishi Institute for Spiritual and Intuitional Education, Aliyar, Pollachi, for Kongu Engineering College.

Course Outcomes:

On completion of the course the students will be able to

- understand the purpose and value of life
- exhibit positive human values
- understand social values
- take steps to develop mental and physical health

14PHL21 PHYSICAL SCIENCES LABORATORY II

(Common to all Engineering and Technology branches)

0 0 3 1

PART-A: APPLIED PHYSICS LABORATORY
(Any five experiments)

LIST OF EXPERIMENTS:

1. Determination of band gap of a semiconductor material using post office box.
2. Determination of dispersive power of a prism using spectrometer.
3. Determination of viscosity of liquid - Poiseuille's method.
4. Determination of thickness of a thin wire – air wedge method.
5. Determination of AC frequency using Melde's string experiment.
6. Determination of hysteresis loss in a ferromagnetic material.

Demonstration

1. Thin film deposition using RF magnetron sputtering technique
2. Synthesis of nano-particles
3. Phase change memory materials - RW CD / DVD

PART - B: APPLIED CHEMISTRY LABORATORY
(Any five experiments)

LIST OF EXPERIMENTS:

1. Estimation of Chloride in the given water sample.
2. Determination of Dissolved Oxygen in the given wastewater sample.
3. Estimation of Ferrous ion in the given solution.
4. Estimation of Copper in the given solution by Iodometric method.
5. Estimation of Chromium (Cr^{6+}) in the wastewater.
6. Estimation of copper content of the given solution by EDTA method.

Demonstration

1. Turbidity measurement using Nephelometer
2. COD analyzer
3. Dissolved Oxygen measurement using DO analyzer

TOTAL : 45

REFERENCES / MANUALS / SOFTWARE:

1. Physics Laboratory Manual –Dr.K.Tamilarasan and Dr.K.Prabu
2. Chemistry Laboratory Manual- Dr.P.N.Palanisamy, P.Manikandan, A.Geetha and K.Manjularani

Course Outcomes:

On completion of the course the students will be able to

- describe the basics of band gap of semiconductors, dispersive power of a prism, viscosity of liquids, interference of light, AC frequency and hysteresis of ferromagnetic materials
- operate the instruments like office box, air wedge arrangement, Melde's string apparatus and hysteresis arrangement, and to measure the related parameters
- estimate the amount of DO and Chloride in a given water sample
- determine the amount of chromium, ferrous ion and copper in wastewater

14MEL11 BASICS OF CIVIL AND MECHANICAL ENGINEERING LABORATORY

(Common to all Engineering and Technology branches)

0 0 3 1

LIST OF EXPERIMENTS:

1. To prepare a square or rectangular shaped two identical MS plates by cutting and filing operations
2. To prepare a square/rectangular/circular/trapezoidal/Vshaped projection and its counterpart formating from the given square or rectangular MS plates.
3. To carryout drilling, tapping and assembly on the given MS plates.
4. To carryout thread forming on a GI and PVC pipes and cut to the required length.
5. To use various pipe fitting accessories and prepare water leak proof water line from overhead tank.
6. To prepare a T/L/Lap joint from the given wooden work pieces.
7. To prepare a plywood box/tray to the given dimensions.
8. To prepare a leak proof sheet metal tray/box/funnel to the given dimensions.
9. Cutting of MS plates by gas cutting method and arc weld joining by Lap/Butt/T joint method
10. Preparing a simple PVC window/door frame assembly.
11. Preparing a simple memento or similar articles using wood/sheet metal
12. Preparing innovative articles involving waste metals.

TOTAL : 45

REFERENCES / MANUALS / SOFTWARE:

1. Introduction to basic manufacturing processes and workshop technology by Rajender Singh, New Age International (P) Limited, 2006.
2. Elements of Workshop Technology by S.K.Hajra Choudhury, Media Promoters, 2009.

Course Outcomes:

On completion of the course the students will be able to

- demonstrate knowledge on safety and adhere to safety features
- mark the given dimensions accurately and execute cutting and joining operations
- select methods and tools and execute the given experiments
- finish the job to the requirements and quantify the accuracy
- plan and complete simple and innovative articles

14MAT31 MATHEMATICS III

(Common to all Engineering and Technology Branches)

3 1 0 4

UNIT – I **9**

Fourier Series: Dirichlet's conditions – General Fourier series – Change of interval - Odd and even functions – Half range Sine series – Half range Cosine series – Harmonic analysis.

UNIT – II **9**

Partial Differential Equations: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Lagrange's linear equation – Homogeneous linear partial differential equations of higher order with constant coefficients.

UNIT – III **9**

Applications of Partial Differential Equations: Classification of second order quasi linear partial differential equations – Solutions of one dimensional wave equation – One dimensional heat equation – Steady state solution of two dimensional heat equation (excluding insulated edges).

UNIT – IV **9**

Fourier Transform: Fourier Integral theorem (without proof) – Fourier transform pair – Properties – Transforms of simple functions – Fourier Sine and Cosine transforms – Convolution theorem and Parseval's identity (Statement and applications only).

UNIT – V **9**

Z - Transform: Definition – Elementary properties – Z-transform of some basic functions – Inverse Z-transform – Partial fraction method – Residue method – Convolution theorem – Applications of Z-transforms – Solution of difference equations.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOKS:

1. Kandasamy P., Thilagavathy K. and Gunavathy K., "Engineering Mathematics, Volume - III", Reprint Edition, S.Chand & Co., New Delhi, 2014.
2. Veerarajan T., "Transforms and Partial Differential Equations", 3rd Reprint, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2013.

REFERENCE BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, Delhi, 2014.
2. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Reprint Edition, Narosa Publishing House, New Delhi, 2014.
3. Bali N.P. and Manish Goyal, "A Text Book of Engineering Mathematics", 9th Edition, Laxmi Publications, New Delhi, 2014.
4. Ramana B.V., "Higher Engineering Mathematics", 11th Reprint, Tata McGraw Hill Publishing Company, New Delhi, 2010.
5. Erwin Kreyzig, "Advanced Engineering Mathematics", 10th Edition, Wiley & Co, 2011.

Course Outcomes:

On completion of the course the students will be able to

- expand a function in terms of Fourier series and apply it for solving engineering problems
- model and solve higher order partial differential equations
- apply the methods of solving PDE in practical problems
- gain knowledge on Fourier transforms
- handle problems in Z transforms and apply it to solve difference equations

14CST31 DATA STRUCTURES

3 0 0 3

Pre-requisites: Problem Solving and Programming

UNIT – I **9**

List: Data Structures - Abstract Data Types (ADT)-List ADT and Array Implementation - Linked List - Doubly Linked List - Circular Linked List - Applications of Linked Lists

UNIT – II **9**

Stack and Queues: Stack ADT – Array and Linked List implementation of Stacks- Applications of Stacks - Queue ADT – Array and Linked List implementation of Queues - Circular Queue- Applications of Queues

UNIT – III **9**

Trees: Trees-Preliminaries – Binary Trees – The Search Tree ADT – Binary Search Trees – AVL Trees –Tree Traversals - Priority Queues (Heaps) – Binary Heap - d Heaps.

UNIT – IV **9**

Sorting and Hashing: Sorting - Preliminaries – Insertion Sort – Bubble Sort – Heapsort – Mergesort – Quicksort – External Sorting – Hashing – General Idea – Hash Function – Separate Chaining – Open Addressing.

UNIT – V **9**

Graphs: Graphs - Definitions – Topological Sort – Shortest-Path Algorithms – All Pair Shortest Path-Algorithm – Dijkstra's Algorithm – Minimum Spanning Tree – Prim's Algorithm- Kruskal's Algorithm – Breadth First Search - Depth First Search-– Undirected Graphs – Biconnectivity

TOTAL: 45

TEXT BOOKS:

1. Weiss M. A., "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education Asia, New Delhi, 1997.

REFERENCE BOOKS:

1. Aho A.V., Hopcroft, J.E. and Ullman J.D., "Data Structures and Algorithms", 1st Edition, Pearson Education, New Delhi, 1983.
2. Langsam Y.M, Augenstein J. and Tenenbaum, A. M., "Data Structures using C and C++", 2nd Edition, Pearson Education, 1996.
3. Sara Baase Allen Van Gelder, "Computer Algorithms: Introduction to Design and Analysis", 3rd Edition, Pearson Education Asia, New Delhi, 2000.

Course Outcomes:

On completion of the course the students will be able to

- describe the usage of various implementation of list
- make use of ADTs like stacks and queues in different systems
- illustrate the structure and operations on trees
- summarize various sorting and searching techniques
- apply appropriate graph algorithms for solving computing problems

14CST32 OBJECT ORIENTED PROGRAMMING USING C++

(Common to CSE & IT branches)

3 0 0 3

Pre-requisites: Problem Solving and Programming

UNIT – I **9**

Object-Oriented Programming: The Object-Oriented Approach- Characteristics of Object-Oriented Languages- C++ Programming Basics : Loops and Decisions - Functions : Passing Arguments to Functions - Returning Values from Functions - Reference Arguments - Overloaded Functions – Recursion - Inline Functions - Default Arguments - Scope and Storage Class.

UNIT – II **9**

Objects and Classes: A Simple Class - Objects as Data Types - Constructors – Constructor Types - Objects as Function Arguments - The Default Copy Constructor - Returning Objects from Functions - Classes, Objects and Memory - Static Class Data – Arrays : Arrays as Class Member Data - Arrays of Objects – Namespaces.

UNIT – III **9**

Operator Overloading and Inheritance: Operator Overloading : Overloading Unary Operators - Overloading Binary Operators -Overloading the Assignment Operator- Data Conversion–Inheritance : Derived Class and Base Class - Derived Class Constructors - Overriding Member Functions - Class Hierarchies - Public and Private Inheritance - Types of inheritance- Strings : The Standard C++ string Class

UNIT – IV **9**

Pointers, Virtual and Friend Functions: Pointers : Addresses and Pointers - The Address-of Operator & - Memory Management: new and delete - Virtual Functions : Normal Member Functions Accessed with Pointers - Virtual Member Functions Accessed with Pointers - Abstract Classes and Pure Virtual Functions - Friend Functions : Friends as Bridges - Static Functions.

UNIT – V **9**

IO Streams, Template and Exceptions: Streams and Files : Stream Classes - Disk File I/O with Streams - Writing Data - Reading Data - Character I/O - Binary I/O - Templates and Exceptions : Function Templates - Class Templates – Exceptions.

TOTAL: 45

TEXT BOOKS:

1. Robert Lafore, "Object Oriented Programming in C++", 4th Edition, SAMS Publishers, 2001.

REFERENCE BOOKS:

1. Trivedi B., "Programming with ANSI C++", 2nd Edition, Oxford University Press, Oxford University, 2012.
2. Eckel B and Allison C, "Thinking in C++ Volume Two: Practical Programming", Pearson Education, New Delhi, 2004.
3. Lippman S.B., Lajoie Josee and Moo Barbara E., "C++ Primer", 4th Edition, Pearson Education, New Delhi, 2005.
4. Stroustrup B., "The C++ Programming Language", 3rd Edition, Pearson Education, New Delhi, 2004.

Course Outcomes:

On completion of the course the students will be able to

- explain the basic concepts of object oriented programming with C++
- relate real world problems to classes and objects
- apply data encapsulation, inheritance and polymorphism to simple applications
- examine the application of advanced concepts like pointers, virtual functions and friend functions
- utilize the features of templates, exception and file handling mechanisms

14CST33 COMPUTER ORGANIZATION

(Common to CSE & IT branches)

3 0 0 3

UNIT – I **9**

Basic Structure of Computers and Machine Instructions: Functional units - Basic operational concepts - Bus structures – Software - performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O Operations

UNIT – II **9**

Arithmetic Unit: Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication - Fast multiplication – Integer Division – Floating point numbers and Operations.

UNIT – III **9**

Basic Processing Unit: Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Microprogrammed control: Microprogram Sequencing –Wide Branch Addressing. Pipelining – Basic concepts – Data hazards – Instruction hazards – Superscalar operation.

UNIT – IV **9**

Memory System: Basic concepts – Semiconductor RAM: Internal Organization of Memory chips- Static Memories – Asynchronous DRAMs – Synchronous DRAMs- ROMs – Speed, Size and Cost – Cache memories - Performance consideration – Virtual memory - Secondary Storage.

UNIT – V **9**

I/O Organization: Accessing I/O devices – Interrupts: Interrupt Hardware-Enabling and Disabling Interrupts-Handling Multiple Devices – Direct Memory Access – Buses – Interface Circuits – Standard I/O Interfaces: SCSI and USB.

TOTAL: 45

TEXT BOOKS:

1. Hamacher Carl, Vranesic Zvonko, and Zaky Safwat, "Computer Organization", 6th Edition, McGraw Hill, New York, 2013.

REFERENCE BOOKS:

1. Hayes, John P., "Computer Architecture and Organization", 3rd Edition, Tata McGraw Hill Publishing Company, New Delhi, 2008.
2. Patterson David, A. and Hennessy John L., "Computer Organization and Design: The Hardware / Software Interface", 2nd Edition, Harcourt Asia, Morgan Kaufmann, Singapore, 2009.
3. Stallings William, "Computer Organization and Architecture: Designing for Performance", 6th Edition, Pearson Education, New Delhi, 2003.
4. Heuring V.P. and Jordan H.F., "Computer Systems Design and Architecture", 2nd Edition, Pearson Education, New Delhi, 2004.

Course Outcomes:

On completion of the course the students will be able to

- describe the basic structure and operation of a digital computer
- identify the operations of the arithmetic unit including the algorithms
- illustrate the saliency of central processing unit and pipelining
- analyze the memory sub-system of a typical computer
- compare the different ways of communication with I/O devices and standard I/O interfaces

14CST34 DIGITAL LOGIC AND VERILOG PROGRAMMING

3 0 0 3

UNIT – I **9**

Digital Systems and Binary Numbers: Digital Systems-Binary Numbers- Number base Conversions – Octal and Hexadecimal Numbers – Complements of Numbers – Signed Binary Numbers – Binary Codes- Binary Storage and Registers- Binary Logic. **Boolean Algebra and Logic Gates:** Introduction – Basic Definitions – Axiomatic Definition of Boolean Algebra – Basic Theorems and Properties of Boolean Algebra- Boolean Functions – Canonical and Standard Forms – Other Logic Operations – Digital Logic Gates – Integrated Circuits.

UNIT – II **9**

Gate Level Minimization: Introduction – The Map Method – Four Variable K-Map – Product of Sums Simplification – Don't Care Conditions – NAND and NOR implementation – Other Two Level implementations – Exclusive OR Function. **Hardware Description Language:** Module declaration-Gate Delays – Boolean Expressions-User Defined Primitives.

UNIT – III **9**

Combinational Logic: Introduction – Combinational Circuits – Analysis Procedure – Design Procedure- Binary Adder subtractor- Decimal Adder – Binary Multiplier – Magnitude Comparator – Decoders – Encoders – Multiplexers. **HDL Models of Combinational Circuits:** Gate Level Modeling- Dataflow Modeling – Behavioural Modeling.

UNIT – IV **9**

Synchronous Sequential Logic: Introduction – Sequential Circuits – Storage Elements : Latches, Flip Flops- Analysis of clocked sequential circuits – Synthesizable HDL Models of sequential circuits: Behavioural Modeling- HDL models for Flip Flops and Latches. **Registers and Counters:** Registers-Shift Registers-Ripple Counters – Synchronous Counters –Other Counters.

UNIT – V **9**

Memory and Programmable Logic: Introduction – Random Access Memory – Memory Decoding – Error Detection and Correction – Read Only Memory- Programmable Logic Array – Programmable Array Logic – Sequential Programmable Devices. **Design at the Register Transfer Level:** Introduction – Register Transfer Level Notation – Register Transfer Level in HDL.

TOTAL: 45

TEXT BOOKS:

1. Morris Mano M. and Michael D. Ciletti, "Digital Design – With an Introduction to the Verilog HDL", 5th Edition, Pearson Education, 2013.

REFERENCE BOOKS:

1. Yarbrough, John M., "Digital Logic Applications and Design", Thomson Publications, New Delhi, 2007.
2. Leach, Donald P. and Malvino, Albert Paul, "Digital Principles and Applications", 5th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2003.
3. Givone and Donald D., "Digital Principles and Design", Tata McGraw Hill Publishing Company, New Delhi, 2003.
4. Roth Charles H., "Fundamentals of Logic Design", Thomson Publication Company, New Delhi, 2003.

Course Outcomes:

On completion of the course the students will be able to

- explain the basics of digital systems and boolean algebra
- design circuits using basic gates with the help of K-map
- summarize various combinational logic circuits using HDL models
- build sequential circuits using registers and counters
- outline the application of memory and programmable logic in system design using RTL

14ECT33 COMMUNICATION ENGINEERING

(Common to EEE, EIE, CSE & IT branches)

3 0 0 3

UNIT – I **9**

Amplitude Modulation: Principles of amplitude modulation – AM envelope - Frequency spectrum and bandwidth - Modulation index and percentage modulation - AM power distribution - AM modulator circuits – Low level AM modulator - AM transmitters – Low level transmitter - AM receivers – Superheterodyne receivers

UNIT – II **9**

Angle Modulation: Angle Modulation – FM and PM waveforms - Phase deviation and modulation index - Frequency deviation - Direct FM and PM demodulators - Frequency spectrum of angle modulated waves - Bandwidth requirement - Narrowband FM and Broadband FM - Average power - FM and PM modulators, Direct FM transmitter - Angle modulation vs. amplitude modulation - Double conversion FM receivers - PLL FM demodulator.

UNIT – III **9**

Digital Modulation: Sampling - Time Division Multiplexing - Digital T-carrier System – Pulse code modulation – Amplitude shift keying - Frequency and phase shift keying – Modulator and demodulator - bit error rate calculation

UNIT – IV **9**

Data Communication: Data communication codes: ASCII - BAR codes - Error Control - Error Detection - Redundancy checking - Error Correction - Hamming – Line coding : AMI – NRZ - RZ - Serial interfaces : RS232 - RS485 - Data communication circuits - Data communication modems - Public Switched Telephone Network(PSTN) – ISDN

UNIT – V **9**

Wireless Technologies: Cellular telephone systems – Cellular concepts – Second generation (2G) Third generation (3G) and (4G) cell phone systems – PANs and Bluetooth - Zigbee and Mesh wireless networks - Infrared wireless networks

TOTAL: 45

TEXT BOOKS:

1. Wayne Tomasi, "Electronic Communications Systems: Fundamentals Through Advanced", 5th Edition, Pearson Education, 2008.

REFERENCE BOOKS:

1. Michael Moher and Simon Haykin, "Communication System", 5th Edition, Wiley India Pvt. Ltd., 2011.
2. Frenzel and Louis E., "Principles of Electronic Communication Systems", 3rd Edition, Tata McGraw Hill Publishing Company, New Delhi, 2008.
3. Anokh Singh, "Principles of Communication Engineering", S. Chand & Co., New Delhi, 2006.

Course Outcomes:

On completion of the course the students will be able to

- paraphrase amplitude and angle modulation techniques
- learn the concepts of digital modulation techniques
- summarize the concepts in data communication and network protocol
- identify the cellular telephone systems and concepts
- identify the next generation wireless technologies

14CSL31 DATA STRUCTURES LABORATORY

0 0 3 1

LIST OF EXPERIMENTS / EXERCISES:

1. Implementation of C programs using pointers
2. Implementation of singly linked list and its operations
3. Implementation of doubly linked list and its operations
4. Implementation of stack and its operations
5. Infix to postfix conversion using stack
6. Implement the application for evaluating postfix expressions using array of stack ADT
7. Implementation of queue and its operations
8. Implementation of circular queue and its operations
9. Implementation of binary search tree traversals
10. Implementation of sorting algorithms: insertion sort, bubble sort, quick sort and merge sort
11. Implementation of Dijkstra's algorithm to find shortest path
12. Implementation of spanning tree algorithms
13. Implementation of graph traversal techniques

TOTAL: 45

REFERENCES / MANUALS / SOFTWARE:

1. GCC Compiler

Course Outcomes:

On completion of the course the students will be able to

- identify the appropriate data structure for a given problem
- apply data structures to practical applications
- synthesize operations like searching, sorting, insertion, deletion and traversing on various data structures

14CSL32 OBJECT ORIENTED PROGRAMMING USING C++ LABORATORY

(Common to CSE & IT branches)

0 0 3 1

LIST OF EXPERIMENTS / EXERCISES:

1. Design C++ classes with data members and member functions
2. Design C++ classes with static members and member functions with default arguments
3. Design C++ classes with friend functions and function overloading
4. Program using different types of constructors and destructor
5. Implement matrix class with dynamic memory allocation and necessary methods
6. Implement complex number class with unary and binary operator overloading
7. Overload the new and delete operators to provide custom dynamic allocation of memory
8. Implement different types of inheritance
9. Develop suitable hierarchy of classes to demonstrate dynamic polymorphism
10. Implement programs with sequential access and random access file
11. Develop function templates of standard sorting algorithms such as bubble sort, insertion sort
12. Design stack and queue classes with necessary exception handling
13. Program to create simple manipulator and namespace

TOTAL: 45

REFERENCES / MANUALS / SOFTWARE:

1. Linux Operating System
2. C ++ Compiler

Course Outcomes:

On completion of the course the students will be able to

- identify and create objects and their members for a given problem
- experiment the use of friend function, static function, constructor and destructor
- develop programs using various types of operator and function overloading
- demonstrate the use of inheritance and runtime polymorphism
- apply the concepts of files and templates

14CSL33 DIGITAL LOGIC AND VERILOG PROGRAMMING LABORATORY

0 0 3 1

LIST OF EXPERIMENTS / EXERCISES:

1. a. Verification of tables using digital logic gates
   b. Verification of boolean theorems using digital logic gates
2. Design and implementation of combinational circuits using basic gates and universal gates for arbitrary functions
3. Design and implementation of code converters
4. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices
5. Design and implementation of parity generator / checker using basic gates and MSI devices
6. Design and implementation of magnitude comparator
7. Design and implementation of multiplexers and demultiplexers
8. Design and implementation of decoders and encoders
9. Verification of operation of flip-flops
10. Design and implementation of shift registers in SISO, SIPO modes using suitable IC's
11. Design and implementation of shift registers in PISO, PIPO modes using suitable IC's
12. HDL implementation of combinatorial circuits and flip-flops

TOTAL: 45

REFERENCES / MANUALS / SOFTWARE:

1. Lab Manual

Course Outcomes:

On completion of the course the students will be able to

- experiment and verify truth tables and state diagrams
- design combinational logic and sequential logic circuits
- express simple circuits using Verilog HDL

14MAT43 DISCRETE MATHEMATICS

(Common to CSE & IT branches)

3 1 0 4

UNIT – I **9**

Propositional Calculus: Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Contrapositive – Logical equivalences and implications – DeMorgan's Laws – Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference – Arguments – Validity of arguments

UNIT – II **9**

Predicate Calculus: Predicates – Statement function – Variables – Free and bound variables – Quantifiers – Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – The rules of universal specification and generalization – Validity of arguments.

UNIT – III **9**

Set Theory: Cartesian product of sets – Relations on sets – Types of relations and their properties – Relational matrix and the graph of a relation – Equivalence relations – Partial ordering – Poset – Hasse diagram – Lattices – Properties of lattices.

UNIT – IV **9**

Functions: Definition – Classification of functions – Composition of functions – Inverse functions – Binary and n-ary operations – Characteristic function of a set – Permutation functions.

UNIT – V **9**

Group Theory: Groups and Subgroups (Definitions only) – Homomorphism – Cosets – Lagrange's theorem – Normal subgroups – Coding Theory – Group codes – Basic notions of error correction - Error recovery in group codes (Excluding theorems in coding theory).

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOKS:

1. Trembaly J.P. and Manohar R., "Discrete Mathematical Structures with Applications to Computer Science", 30th Reprint, Tata McGraw Hill Publishing Company, New Delhi, 2011.
2. Veerarajan T., "Discrete Mathematics with Graph Theory and Combinatorics", Reprint Edition, Tata McGraw Hill Publishing Company, New Delhi, 2013.

REFERENCE BOOKS:

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", 7th Edition, Tata McGraw Hill Publishing Company, 2012.
2. Bernard Kolman, Robert C. Busby and Sharon Cutler Ross, "Discrete Mathematical Structures", 6th Edition, Pearson Education, New Delhi, 2009.
3. Venkatraman M.K., Sridharan N. and Chandrasekaran N., "Discrete Mathematics", The National Publishing Company, Chennai, 2007.
4. Doerr Alan and Kenneth Levassaur, "Applied Discrete Structures for Computer Science", 2nd Edition, Galgotia Publications Pvt., Ltd., New Delhi, 2010.
5. Judith L Gersting, "Mathematical Structures for Computer Science", 6th Edition, W. H. Freeman & Co., New York, 2006.

Course Outcomes:

On completion of the course the students will be able to

- use mathematical proof techniques to solve computing problems
- know how to construct algorithms and derive complexities
- possess knowledge of sets that are required for developing computational models
- perform computational operations associated with functions
- implement the concepts of group structures in coding theory

14CST41 DATABASE MANAGEMENT SYSTEMS

(Common to CSE & IT branches)

3 1 0 4

UNIT – I **9**

Data Models and Relational Model: Introduction – Database System Applications – Purpose of database systems – View of data – Database Languages – Relational Databases – Database Design – Data Storage and Querying – Transaction Management – Database Architecture – Database Users and administrators - Relational Model – Structure of Relational Databases – Database Schema – Keys – Schema Diagrams – Relational Query Languages - Relational Operations- Relational Algebra

UNIT – II **9**

SQL and Database Design: Overview – SQL data definition - Basic structure – Operations – Aggregate Functions -Nested Sub queries – Modification of the database - Intermediate SQL : Joins – views- Integrity Constraints– SQL data types and schemas – Authorization - Database Design and E-R model : E-R model- Constraints – ER diagrams – Reduction to Relational Schema – ER design issues

UNIT – III **9**

Relational Database Design: Features of good relational designs- atomic domains and first normal form-functional dependency theory - Decomposition using functional dependencies:2NF, 3NF, BCNF – Algorithms for decomposition – Decomposition using Multivalued Dependencies-4NF, 5NF- Data Storage: RAID – Tertiary storage - File Organization – Organization of Records in Files – data dictionary storage- database buffer

UNIT – IV **9**

Indexing and hashing: Ordered indices – B+ Tree index files – Multiple key access - Static and Dynamic Hashing – Bitmap indices – Index in SQL- Query Processing: Overview – Measures of Query Cost - Sorting – Selection, Join and Other Operations – Query optimization – Overview - Transformation of Relational Expressions – Choice of Evaluation Plan

UNIT – V **9**

Transactions: Transaction concept – Transaction model – Storage structure – Transaction atomicity and durability – Isolation – Serializability- Concurrency control : Lock-based Protocols - Deadlock Handling – Multiple Granularity – Timestamp and Validation Based Protocols - Recovery System**:** Failure classification – Storage – Recovery and atomicity – Algorithm – Buffer management – Failure with loss of nonvolatile storage

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOKS:

1. Silberschatz. Abraham, Korth, Henry F. and Sudarshan S., "Database System Concepts", 6th Edition, McGraw Hill, New York, 2011.

REFERENCE BOOKS:

1. Elmasri, Ramez and Navathe, Shamkant B., "Fundamental Database Systems", 6th Edition, Pearson Education, New Delhi, 2010.
2. Date C J, Kannan A and Swamynathan S, "An Introduction to Database Systems", 8th Edition, Pearson Education, New Delhi, 2006.

Course Outcomes:

On completion of the course the students will be able to

- design a relational database using ER model
- apply SQL to create and manipulate a relational database
- survey different normalization methods in the design of relational database
- demonstrate the use of indexing techniques, query processing and recovery system
- explain the concepts of transaction processing and concurrency control methods

14CST42 OPERATING SYSTEMS

(Common to CSE & IT branches)

3 0 0 3

UNIT – I **9**

Operating Systems Overview: Introduction - Computer System Organization - Computer System Architecture - Operating System Operations - System Calls - Type of System Calls - System Programs - OS Generation and System Boot.

UNIT – II **9**

Process Management: Processes-Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication. Threads- Overview, Multicore Programming, Multithreading Models: Process Synchronization - Critical Section Problem-Mutex Lock – Semaphores-Introduction to Monitors. CPU Scheduling algorithms

UNIT – III **9**

Deadlocks: Deadlock Characterization – Methods for handling deadlocks-Deadlock Prevention and Avoidance - Deadlock detection – Recovery from Deadlocks. **Memory Management:** Main Memory-Contiguous Memory Allocation – Segmentation - Paging.

UNIT – IV **9**

Storage Management: Virtual Memory-Demand Paging - Page Replacement - Thrashing. Mass Storage Structure – Overview - Disk Scheduling and Management. File System Storage - File Concepts - Directory and Disk Structure - File Sharing and Protection.

UNIT – V **9**

Files: File System Implementation- File System Structure-Directory Implementation - Allocation Methods- Free Space Management. **Case Study: Linux:** History - Design Principles - Kernel Modules - Process Management - Scheduling-Memory Management. **Windows:** Histroy - Design Principles – System Components: Kernel.

TOTAL: 45

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley & Sons Inc., 2012.

REFERENCE BOOKS:

1. William Stallings, "Operating Systems – Internals and Design Principles", 7th Edition, Prentice Hall, 2011.
2. Andrew S. Tanenbaum, "Modern Operating Systems", 2nd Edition, Addison Wesley, 2001.
3. Charles Crowley, "Operating Systems: A Design-Oriented Approach", Tata McGraw Hill Education, 1996.
4. Dhamdhere D.M., "Operating Systems: A Concept-Based Approach", 2nd Edition, Tata McGraw Hill Education, 2007.

Course Outcomes:

On completion of the course the students will be able to

- outline operating system and its structure
- describe various scheduling algorithms
- paraphrase concurrency, deadlock, prevention and avoidance algorithms
- illustrate the memory and file systems
- demonstrate administrative skills on Linux and windows servers

14CST43 DESIGN AND ANALYSIS OF ALGORITHMS

3 1 0 4

Pre-requisites: Data Structures and Problem Solving and Programming

UNIT – I **9**

Introduction: Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non-recursive algorithms – Empirical analysis of algorithm - Algorithm visualization.

UNIT – II **9**

Brute Force and Divide-and-Conquer: Brute Force - Selection and Bubble Sort, Sequential search and String matching- Depth First Search and Breadth First Search. Divide and conquer methodology – Merge sort – Quick sort – Binary search – Binary tree traversals and related properties-Multiplication of large integers and Strassen's Matrix Multiplication.

UNIT – III **9**

Decrease and conquer: Insertion sort – Topological Sorting-Computing a Median and the Selection Problem. **Transform and conquer:** Presorting - Balanced search trees - AVL trees -2-3Trees- Heaps and Heap sort

UNIT – IV **9**

Dynamic Programming: Knapsack Problem and Memory functions -– Optimal Binary Search Trees - Warshall's and Floyd' algorithm. **Greedy Technique:** Prim's algorithm - Kruskal's Algorithm- Dijkstra's Algorithm - Huffman Trees.

UNIT – V **9**

Backtracking: n-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem. **Branch and Bound:** Assignment problem – Knapsack Problem – Traveling Salesman Problem. Overview of P, NP and NP-Complete Problems

Lectures:45, Tutorial: 15, TOTAL: 60

TEXT BOOKS:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", 3rd Edition, Pearson Education, 2012.

REFERENCE BOOKS:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", 3rd Edition, Prentice Hall of India, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
3. Donald E. Knuth, "The Art of Computer Programming", 3rd Edition, Volumes I & III, Addison Wesley, 2011.
4. Steven S. Skiena, "The Algorithm Design Manual", 2nd Edition, Springer, 2008.

Course Outcomes:

On completion of the course the students will be able to

- explain the different frameworks for algorithm design
- apply brute force and divide and conquer techniques for various problems
- utilize decrease and conquer and transform and conquer strategies for problem solving
- interpret the role of dynamic programming and greedy techniques
- outline P and NP problems with the help of backtracking and branch and bound techniques

14CST44 SOFTWARE ENGINEERING

(Common to CSE & IT branches)

3 0 0 3

UNIT – I **9**

Process Models: Software process structure – Process models: Waterfall model, Incremental process models, Evolutionary process models, Specialized process models – Agile development: Agile process - Extreme programming - Other agile process models.

UNIT – II **9**

Understanding Requirements and Models: Requirements engineering – Eliciting requirements, Developing use cases – Building the analysis model – Negotiating requirements – Requirements monitoring – Validating requirements – Requirements modeling: Requirements analysis – Scenario based modeling – UML models – Class based methods.

UNIT – III **9**

Software Design: Design process – Design concepts – Design models – Architectural design: Software architecture, Architectural styles – Architectural design – Component level design: Views of components, Designing class-based components, Conducting component level design – Designing traditional components – User interface design: User interface analysis and design, Interface analysis, Interface design steps.

UNIT – IV **9**

Software Testing Fundamentals: Software testing strategies: Strategic approach – Issues – Test strategies for conventional and Object Oriented software –Validation and system testing – Debugging – Testing conventional applications: White box testing – Basis path testing – Control structure testing – Black box testing.

UNIT – V **9**

Software Project Management: Software Configuration Management: The SCM repository – The SCM process – Project management concepts – Process and project metrics: Software measurement – Metrics for software quality – Estimation for software projects: Decomposition techniques and empirical estimation models – Project scheduling.

TOTAL: 45

TEXT BOOKS:

1. Roger S. Pressman, Bruce R. Maxim, "Software Engineering: A Practitioner's Approach", 8th Edition, McGraw-Hill, New York, 2014.

REFERENCE BOOKS:

1. Jalote Pankaj, "An Integrated Approach to Software Engineering", 3rd Edition, Narosa Publishing House, New Delhi, 2008.
2. Sommerville I., "Software Engineering", 9th Edition, Addison Wesley, New York, 2010.
3. SWEBOK, "Guide to the Software Engineering Body of Knowledge", A project of the IEEE Computer Society Professional Practices Committee, 2004.

Course Outcomes:

On completion of the course the students will be able to

- compare various software development models
- identify the tasks in requirement engineering and describe several analysis models
- summarize different methods for the design of a software system
- illustrate various software testing methods
- interpret software project management and quality metrics

14ITT42 JAVA PROGRAMMING

(Common to IT & CSE branches)

3 0 0 3

Pre-requisites: Basic Programming Concepts

UNIT – I **9**

Introduction to Java, Classes and Objects: History and Evolution of Java – Overview – Data Types - Variables - Arrays – Operators - Control Statements – Classes – Fundamentals – Declaring Objects - Assigning Object Reference Variables - Methods – Constructors - this keyword - Garbage collection - finalize method - Stack Class

UNIT – II **9**

Reusability, Packages, Interfaces and Exception Handling: Overloading Methods - Objects as Parameters - Argument Passing - Returning Objects – Recursion -Access Control – Static – Nested and Inner Classes - Command-Line Arguments – Variable Length Arguments. Inheritance – Basics – Super keyword - Multilevel Hierarchy - Method Overriding - Dynamic Method Dispatch - Abstract Classes - final with Inheritance. Packages - Access Protection - Importing Packages – Interfaces. Exception Handling – Multiple catch Clauses- Nested try Statements - Java's Built-in Exceptions – User defined Exception – Chained exceptions.

UNIT – III **9**

Multithreading, I/O, Applet and String Handling: Java Thread Model - Creating a Thread - Priorities – Synchronization – Inter thread Communication – Suspending - Resuming, and Stopping Threads – Multithreading. Enumerations - Wrappers – Auto boxing – Annotations. I/O Basics - Reading and Writing Console I/O - PrintWriter Class - Reading and Writing Files - Applet – Architecture – Skeleton – Display methods - Repainting – Applet tag – Passing parameters - transient and volatile modifiers. String Handling – String Class – methods – String Buffer Class – Methods – String Builder.

UNIT – IV **9**

Generics, Collections and Event Handling: Generics – Example – Parameters - General Form- Bounded Types - Wildcard Arguments - Generic Method and Interfaces – Raw Types and Legacy Code - Generic Class Hierarchies. Collection Classes – Array List – Linked List – Hash Set and Maps. Event Handling – Mechanisms -Delegation Event Model - Event Classes - Sources of Events - Event Listener Interfaces – Mouse and Keyboard events - Adapter Classes - Inner Classes.

UNIT – V **9**

AWT: AWT Classes - Window Fundamentals - Frame Windows - Frame Window in an Applet – Graphics –Color – Fonts - FontMetrics. AWT Controls - Layout Managers - Menu Bars and Menus - Dialog Boxes - FileDialog - Handling Events by Extending AWT Components.

TOTAL: 45

TEXT BOOKS:

1. Schildt, Herbert., "Java: The Complete Reference", 9th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2014.

REFERENCE BOOKS:

1. Buyya Rajkumar., Thamarai Selvi S. and Xingchen Chu., "Object Oriented Programming with Java Essentials and Applications", Tata McGraw Hill, 2009.
2. Deitel, Paul and Deitel, Harvey., "Java How to Program", 8th Edition, Eastern Economy Edition, 2009.

Course Outcomes:

On completion of the course the students will be able to

- outline the fundamentals of object-oriented programming in Java
- create applications using thread and exception handling
- understand I/O streams and applet programming in Java
- expertiment with Java packages and collections
- construct the GUI based application with AWT controls

14CSL41 DATABASE MANAGEMENT SYSTEMS LABORATORY

(Common to CSE & IT branches)

0 0 3 1

LIST OF EXPERIMENTS / EXERCISES:

1. Data definition language, commands, integrity constraints
2. Data manipulation language, Data control language commands and TCL commands
3. Nested queries and join operations
4. Views and index
5. PL/SQL statements
6. Cursors
7. Triggers
8. Procedures and functions
9. Embedded SQL
10. Design and implementation of banking system
11. Mini project:
    (Application Development using Oracle/ SQL SERVER / MYSQL)
    - Inventory Control System
    - Hospital Management System
    - Railway Reservation System
    - Web Based User Identification System
    - Hotel Management System
    - Student Information System
    - Library Information System

TOTAL: 45

REFERENCES / MANUALS / SOFTWARE:

1. Front End : Microsoft Visual Studio 6.0, Microsoft .NET Framework SDK v2.0, Java
2. Back End : ORACLE / SQL SERVER / MYSQL

Course Outcomes:

On completion of the course the students will be able to

- develop PL/SQL commands to create and manipulate databases
- create queries using concepts of embedded query languages
- solve real world problems using database concepts

14CSL42 OPERATING SYSTEMS LABORATORY

(Common to CSE & IT branches)

0 0 3 1

LIST OF EXPERIMENTS / EXERCISES:

1. Shell programming - command syntax - write simple functions - basic tests.
2. Shell programming - loops- patterns- expansions- substitutions.
3. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Write programs using the I/O system calls of UNIX operating system (open, read, write, close, etc)
5. Developing application using inter process communication (using pipes or message queues)
6. Implement the producer – consumer problem using semaphores (using UNIX system calls).
7. Implement the following CPU scheduling algorithms

   a) Round Robin b) SJF c) FCFS d) Priority
8. Implement any two page replacement algorithms

   a) FIFO b) LRU c) LFU d) optimal
9. Linux OS installation and installing software from source code as well as using binary package
10. Installing and configuring printers and Samba configuration – file sharing
11. FTP Configuration, web server configuration and firewall configuration
12. Network configuration

TOTAL: 45

REFERENCES / MANUALS / SOFTWARE:

1. GCC Compiler/Linux

Course Outcomes:

On completion of the course the students will be able to

- compare the performance of various CPU scheduling algorithms
- analyze the performance of the various page replacement algorithms
- create processes and implement IPC usage and implement the operating system calls
- develop applications using inter process communication and semaphores
- demonstrate administrative skills on linux servers, FTP server and firewalls

14ITL41 JAVA PROGRAMMING LABORATORY

(Common to IT & CSE branches)

0 0 3 1

LIST OF EXPERIMENTS / EXERCISES:

1. Simple java programs using operators, arrays and control statements
2. Develop a stack data structure using class and object
3. Program to demonstrate inheritance & polymorphism
4. Develop an application using interfaces and packages
5. Program to illustrate exception handling in java and creation of user defined exception
6. Program to illustrate multithreads and Inter thread Communication
7. Program to copy the contents of one file into another file.
8. Develop and configure a simple banner applet
9. Program to demonstrate the features of generics types
10. Program to demonstrate the use of ArrayList, LinkedList, HashSet and Map classes.
11. Program to capture the various keyboard and mouse events.
12. Develop a scientific calculator using event-driven programming paradigm of Java
13. Develop a simple text editor with basic file and edit functionalities

TOTAL : 45

REFERENCES / MANUALS / SOFTWARE:

1. Operating System : Linux
2. Software : JDK8

Course Outcomes:

On completion of the course the students will be able to

- design Java program using object oriented concepts
- develop application using package, multithreading concepts and generics
- create applets and event driven programming applications

14MAT51 PROBABILITY AND QUEUING THEORY

(Common to CSE and IT branches)

3 1 0 4

UNIT – I **9**

Random Variables: Discrete and Continuous random variables – Probability Mass and Probability density functions – Mathematical expectation and Variance – Moments – Moment generating functions - Functions of a random variable.

UNIT – II **9**

Standard Probability Distributions: Discrete Distributions: Binomial distribution – Poisson distribution – Geometric distribution – Continuous Distributions**:** Uniform distribution – Exponential distribution - Gamma distribution – Normal distribution.

UNIT – III **9**

Two Dimensional Random Variables: Joint probability distributions – Marginal and conditional distributions – Covariance – Correlation and regression – Transformation of random variables.

UNIT – IV **9**

Queuing Theory: Characteristics of a queueing system – Kendall's notation – Queuing model I (Infinite capacity single server Poisson queue model) (M/M/1) : (∞/FIFO) – Little's formulae – Queuing model II (Infinite capacity multiple server Poisson queue model (M/M/C): (∞/FIFO) – Queuing model III (Finite capacity single server Poisson queue model) (M/M/1): (N/FIFO) – Queueing model IV (Finite capacity multiple server Poisson model) (M/M/C) : (N/ FIFO).

UNIT – V **9**

Non-Markovian Queues and Queue Networks : M/G/1 queue – Pollaczek-Khintchine formula – Series queues – Open and Closed queuing networks.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOKS:

1. Veerarajan T., "Probability, Statistics and Random Processes", Reprint Edition, Tata McGraw Hill Publishing Company, New Delhi, 2014.

REFERENCE BOOKS:

1. Allen A.O., "Probability, Statistics and Queuing Theory", 2nd Edition, Academic Press, New Delhi, 1990.
2. Trivedi K.S., "Probability and Statistics with Reliability, Queueing and Computer Science Applications", 2nd Edition, John Wiley and Sons, 2002.
3. Roy D. Yates and David J. Goodman, "Probability and Stochastic Processes - A friendly Introduction for Electrical and Computer Engineers", 2nd Edition, John Wiley & Sons, 2012.
4. Gross D. and Harris C.M., "Fundamentals of Queuing Theory", 2nd Edition, John Wiley and Sons, New York, 2008.
5. Papoulis A.,"Probability, Random Variables and Stochastic Processes", 4th Edition, McGraw Hill, New Delhi, 2010.

Course Outcomes:

On completion of the course the students will be able to

- classify random variables and apply suitably in practical problems
- analyze and interpret practical situations and fit a suitable probability distribution
- apply effectively the concepts of two dimensional random variables
- correlate the data which appear in engineering problems
- identify the real time queue in computer networks and take decision accordingly

14ITT51 COMPUTER COMMUNICATION NETWORKS

(Common to IT & CSE branches)

3 0 0 3

Pre-Requisites: Communication Engineering

UNIT – I **9**

Introduction to Data Communications and Physical Layer: Components - Data representations – Data flow – Networks – Criteria- Physical structures- Network Types. Network Models: Protocol layering -TCP/IP Protocol suite - The OSI Model. **Physical Layer:** Digital transmission: Digital-to-digital conversion, Transmission modes. Transmission media: Guided – Unguided media.

UNIT – II **9**

Data-link Layer: Link layer addressing – ARP- RARP - Error detection and correction: Block coding – Cyclic codes – Checksum –Forward Error Correction. Framing - Flow and Error control - Data-link layer protocols: Simple protocol, Stop-wait, Piggybacking - HDLC - Point-to-point protocol. MAC protocols: Random Access - Controlled access - Channelization – Wired LAN: Standard Ethernet - Connecting devices.

UNIT – III **9**

Network Layer: Network layer services – Packet switching – Network layer performance - IPV4 addresses – Internet Protocol (IP) - ICMPv4. Unicast Routing: Routing Algorithms: Distance-Vector and Link-state routing – Routing Protocols: RIP and OSPF. Multicast Routing: Introduction- Basics – Intradomain Multicast Protocols: DVMRP, MOSPF- IGMP.

UNIT – IV **9**

IPv6 and Transport Layer: IPV6 addressing, IPV6 protocol. **Transport Layer:** Introduction – Transport layer protocols: Simple protocol, Stop-wait protocol, Go-Back-N and Selective repeat protocols – UDP – TCP – SCTP.

UNIT – V **9**

QoS and Application Layer: Quality of Service: Data Flow Characteristics, Techniques to improve QoS – Integrated and Differentiated Services. **Application Layer:** WWW and HTTP- FTP - Electronic mail –Telnet - SSH, DNS. Network Management: SNMP.

TOTAL: 45

TEXT BOOKS:

1. Forouzan, Behrouz A., "Data Communication and Networking", 5th Edition, Tata McGraw Hill, New Delhi, 2013.

REFERENCE BOOKS:

1. Kurose James F. and Ross Keith W., "Computer Networking: A Top-Down Approach ", 6th Edition, Pearson Education, New Delhi, 2012.
2. Tanenbaum, Andrew S. and David Wetherall, "Computer Networks", 5th Edition, Prentice Hall of India, New Delhi, 2010.
3. Stallings, William, "Data and Computer Communication", 10th Edition, Pearson Education, New Delhi, 2013.

Course Outcomes:

On completion of the course the students will be able to

- explain how communication works in data networks and the internet
- recognize the different internetworking devices and their functions
- analyze the services, roles and features of the various layers of networks
- design, calculate, and apply subnet masks and addresses to fulfil networking requirements
- differentiate various types of network configurations, components and protocols and applying them to meet the changing and challenging networking needs of organizations

14ITT52 WEB TECHNOLOGY

(Common to IT & CSE branches)

3 0 0 3

Pre-requisites: Programming Concepts

UNIT – I **9**

HTML: Introduction to Computers and the Internet –HTML 5 – Basic Tags – Input Tags- Page structured element - Cascading Style Sheet –Part I

UNIT – II **9**

Client Side Scripting: Introduction to Java Script - Control Statements I – Control statements II- Functions – Arrays

UNIT – III **9**

Java Script Objects: Objects - Document Object Model : Objects and Collections – Events – Event Handling

UNIT – IV **9**

Web Server: Introduction – HTTP Transaction – Multi Tier Application Architecture – Accessing Web Server- Apache –MySQL – PHP Installation – Microsoft IIS Server –AJAX- XMLHttpRequest

UNIT – V **9**

Server Side Scripting: PHP – Introduction – Operators – Arrays – Strings – Regular Expressions – Form Processing – Database Connectivity – Session Tracking

TOTAL: 45

TEXT BOOKS:

1. Paul Deitel, Harvey M.Deitel and Abbey Deitel, "Internet and World Wide Web - How To Program", 5th Edition, Prentice Hall, 2011.

REFERENCE BOOKS:

1. Xavier C., "World Wide Web Design with HTML", 2nd Edition, Tata McGraw Hill, New Delhi, 2012.
2. Godbole A.S. and Kahate A., "Web Technologies", 3rd Edition, Tata McGraw-Hill, New Delhi, 2013.
3. Ladd Eric and O' Donnel Jim, "Using HTML 4, XML and Java", 1st Edition, Prentice Hall of India, New Delhi, 2000.
4. www.w3schools.com

Course Outcomes:

On completion of the course the students will be able to

- design static web pages using HTML
- develop interactive web pages using Java script
- validate the HTML form data using Java script
- optimize the performance of web page loading using AJAX technology
- develop web application using PHP with database connectivity and session tracking

14CST51 OBJECT ORIENTED SYSTEM DESIGN

(Common to CSE & IT branches)

3 0 0 3

UNIT – I **9**

Introduction: An overview of object oriented systems development - Object basics – Object oriented systems development life cycle- Software development process - Building high-quality software - Rumbaugh methodology – Booch methodology - Jacobson methodology - Patterns – Frameworks – Unified Approach

UNIT – II **9**

UML: Introduction - Unified Modeling Language – Static model - Dynamic model - UML diagrams-UML class diagram - Use case diagram – UML dynamic modeling - UML interaction diagrams -UML state chart diagram - UML activity diagram - Implementation Diagrams -component diagram - Deployment diagram - UML extensibility - Use-case model-Developing effective documentation

UNIT– III **9**

Object Oriented Analysis: Noun Phrase Approach-Common class patterns approach-Use case driven Approach-Classes-Responsibilities- Collaborators- Naming classes- Associations-Super-Sub Class relations-A-part of Relationships – Aggregations-Class Responsibility: Identifying Attributes and Methods-Defining Attributes by analysing Use cases and other UML diagrams-Object Responsibilities-Case study

UNIT– IV **9**

Object Oriented Design: Object oriented design process - Object oriented design axioms-Corollaries- Coupling – Cohesion –Design Patterns- Designing classes - UML object constraint language-Class visibility - Refining attributes - Designing methods and protocols-Designing Methods for Bank Objects-Packages and Managing Classes

UNIT – V **9**

View Layer: Designing view layer classes - Macro level process - Micro level process-Purpose of view layer interface-Prototyping the user interface-case study: Designing user interface for Bank ATM. **System Usability Measures:** Usability testing -User Satisfaction testing-User Satisfaction test template –Case study : Developing usability test plans and test cases for Bank ATM

TOTAL: 45

TEXT BOOKS:

1. Ali Bahrami, "Object Oriented Systems Development", 1st Edition, Tata McGraw-Hill, New Delhi, 2008.

REFERENCE BOOKS:

1 Russ Miles and Kim Hamiliton, "Learning UML 2.0", 1st Edition, O'reilly, 2006.
2. John Deacon, "Object Oriented Analysis and Design", 1st Edition, Pearson Education, 2009.
3. Craig Larman, "Object Oriented Analysis and Design", 3rd Edition, Prentice Hall of India, 2005.
4. James Rumbaugh, Ivar Jacobson and Grady Booch, "The Unified Modeling Language Reference Manual", 2nd Edition, Addison Wesley, 2005.
5. Carol Britton, Jill Doake, "A Student Guide to Object-Oriented Development", Elsevier Publications, 2005.

Course Outcomes:

On completion of the course the students will be able to

- apply the different techniques to get the system requirements and present it in standard format
- utilize software objects to build systems that are more robust
- analyse and design using the Object-Oriented Analysis and Design (OOAD) concepts for developing Object Oriented Projects
- identify objects, relationships, services and attributes and construct UML diagrams using appropriate notations
- apply appropriate design patterns

14CST52 THEORY OF COMPUTATION

(Common to CSE & IT branches)

3 1 0 4

Pre-requisites: Discrete Mathematics

UNIT – I **9**

Automata and Regular Expressions: Introduction to formal proof -Finite Automata (FA) Deterministic Finite Automata (DFA)– Non-deterministic Finite Automata (NFA) – Finite Automa with Epsilon transitions.

UNIT – II **9**

Regular Expressions and Languages: Regular expression – FA and regular expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of automata.

UNIT – III **9**

Context Free Grammar and Languages: Context-Free Grammar (CFG) – Parse trees – Ambiguity in grammars and languages. Definition of the pushdown automata – Languages of pushdown automata – Equivalence of pushdown automata and CFG- Deterministic pushdown automata.

UNIT – IV **9**

Context Free Languages and Turing Machines: Normal forms for CFG- Chomsky Normal Form and Greibach Normal Form – Pumping lemma for CFL. Turing machines – Programming techniques for Turing machines.

UNIT - V **9**

Undecidability: A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing machine – Post's correspondence problem-The classes P and NP – Kruskal's algorithm – The traveling salesman problem.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOKS:

1. Hopcroft J.E., Motwani R. and Ullman J.D., "Introduction to Automata Theory, Languages and Computations", 3rd Edition, Pearson Education, New Delhi, 2008.
2. Martin J., "Introduction to Languages and the Theory of Computation", 4th Edition, Tata McGraw-Hill, New Delhi, 2010.

REFERENCE BOOKS:

1. Lewis H.R. and Papadimitriou C.H., "Elements of the Theory of Computation", 2nd Edition, Pearson Education / PHI, New Delhi, 2007.
2. Linz P., "Introduction to Formal Language and Computation", 4th Edition, Narosa Publishing, 2007.
3. Nasir and Sirmani, "A Text Book on Automata Theory", Cambridge University Press, 2008.
4. Kamala Krithivasan and Rama R., "Introduction to Automata Theory, Formal Languages and Computation", 1st Edition, Pearson Education, 2009.
5. Kavi Mahesh, "Theory of Computation : A Problem-Solving Approach", International Edition, Wiley India Pvt. Ltd., 2011.

Course Outcomes:

On completion of the course the students will be able to

- apply induction and contradiction methods for theorem proving
- identify regular languages and context Free Languages using formal tools
- explain the relation between regular language and context free language and corresponding recognizers
- differentiate problems in terms of complexity/computability using Turing machines
- develop a theoretical model for problem solving situations in related areas of theoretical computer science

14ITL52 WEB TECHNOLOGY LABORATORY

(Common to IT & CSE branches)

0 0 3 1

LIST OF EXPERIMENTS:

1. Design a Web Page using HTML Tags and host it in Web Server
2. Create a XHTML document to implement types of CSS
3. Design a web page with menu layout. Apply the various formatting using CSS
4. Design a registration page to create email-id and validate the information in the web page using Java Script
5. Write a JavaScript program to use Objects and Collections
6. Design a web page to create simple interactive CGPA calculator
7. Create a website to load the content dynamically using AJAX
8. Create a website for student mark maintenance system using PHP and MySQL
9. Create a website to illustrate Session Tracking in PHP
10. Develop and deploy online reservation system using Java script, CSS , AJAX , PHP, MySQL with Session Tracking

TOTAL : 45

REFERENCES / MANUALS / SOFTWARE:

1. PHP, MySQL, Apache Web Server, IIS and Browser

Course Outcomes:

On completion of the course the students will be able to

- design web pages using HTML and Java Script and deploy it in a web server
- validate the HTML form data using Java script
- develop and deploy web application with database connectivity

14CSL51 CASE TOOLS LABORATORY

(Common to CSE & IT branches)

0 0 3 1

Prepare the following for any two experiments listed below:

1. Define the problem statement and develop an IEEE standard SRS document.
2. Identify the business activities and develop business use case model.
3. Identify Use Cases and develop Use Case model (System use case diagram and UML Activity diagram).
4. Develop MVC (architectural) pattern and design pattern.
5. Identity the classes (boundary, controller and entity classes) with UML Class diagram.
6. Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
7. Draw the State Chart diagram.
8. Develop Interface pattern.
9. Identify the User Interface and domain objects. Draw the UML package diagram.
10. Implement the User Interface (presentation) layer using thin client with HTML/Java/JSP/Servlet
11. Implement the Business layer (domain object) using JDBC adapter / EJB.
12. Implement the Data layer using JDBC mapper.
13. Draw Component and Deployment diagrams.
14. Test the implementation.

LIST OF EXPERIMENTS /EXERCISES:

1. Passport Automation system
2. Library Management system
3. Exam Registration
4. Stock Maintenance system
5. Online Course Registration system
6. E-ticketing
7. Insurance management system
8. Credit card processing
9. Expert system
10. Recruitment system
11. Bank Management system
12. Real Time Scheduler

TOTAL: 45

REFERENCES / MANUALS / SOFTWARE:

1. IBM Rational Suite
2. Java / Eclipse IDE/.Net Framework/Visual Studio Package

Course Outcomes:

On completion of the course the students will be able to

- design and implement projects using OO concepts
- use the UML analysis and design diagrams in various applications
- apply appropriate design patterns
- implement a software from design

14GET61 ECONOMICS AND MANAGEMENT FOR ENGINEERS

(Common to all Engineering and Technology branches)

3 0 0 3

UNIT – I **9**

Economics – Basics Concepts and Principles – Demand and Supply – Law of demand and Supply – Determinants – Market Equilibrium – Circular Flow of Economic activities and Income.

UNIT – II **9**

National Income and its measurement techniques. Inflation - Causes of Inflation – Controlling Inflation – Business Cycle. Forms of business – Management Functions: Planning, Organizing, Staffing, Leading and Controlling - Managerial Skills - Levels of Management - Roles of manager.

UNIT – III **9**

Marketing - Core Concepts of Marketing - Four P's of Marketing - New product development - Product Life Cycle - Pricing Strategies and Decisions.

UNIT – IV **9**

Operations Management - Resources - Types of Production system - Site selection, Plant Layout, Steps in Production Planning and Control - Inventory - EOQ Determination.

UNIT – V **9**

Accounting Principles – Financial Statements and its uses – Depreciation: Straight Line and Diminishing Balance Method – Break Even Analysis – Capital Budgeting: Meaning – Types of decisions – Methods (Theory).

TOTAL : 45

TEXT BOOK:

1. "Economics and Management for Engineers", Complied by Department of Management Studies, Kongu Engineering College, McGraw-Hill Education, India, 2013.

REFERENCE BOOKS:

1. Geetika, Piyali Ghosh and Purba Roy Choudhury, "Managerial Economics", 1st Edition, Tata McGraw-Hill, New Delhi, 2008.
2. Jeff Madura, "Fundamentals of Business", Cengage Learning Inc., India, 2007.
3. Stanley L. Brue and Campbell R. Mcconnell, "Essentials of Economics", Tata McGraw-Hill, New Delhi, 2007.
4. Jain S.P., Narang K.L. and Simi Agrawal, "Accounting for Management", 1st Edition, Tata McGraw-Hill, New Delhi, 2009.

Course Outcomes:

On completion of the course the students will be able to

- estimate market equilibrium and interpret national income calculation and inflation issues
- categorize the forms of business and analyse the functions of management
- appraise marketing management decisions
- apply appropriate operation management concept in business situations
- interpret financial and accounting statements

14ITT61 NETWORK PROGRAMMING AND MANAGEMENT

(Common to IT & CSE branches)

3 0 0 3

Pre-requisites: Computer Communication Networks

UNIT – I **9**

Introduction to TCP and TCP Sockets: Transmission Control Protocol– TCP Connection Establishment and Termination – Port Numbers – TCP Port numbers and Concurrent servers – Buffer Sizes and Limitations – Socket address Structures – Value-Result Arguments - Byte ordering functions – Byte Manipulation Functions - Address conversion functions – Elementary TCP Sockets

UNIT – II **9**

Application Development and I/O Multiplexing: TCP Echo Server – TCP Echo Client – Normal Startup and Termination - POSIX Signal handling – SIGCHLD Signals – wait and waitpid functions – Connection abort before accept returns – termination of server – SIGPIPE signal – crashing, shutdown and rebooting of a server host –I/O Multiplexing: I/O Models – select and str-cli function – Batch Input and Buffering - shutdown function – TCP echo Server with multiplexing – poll function

UNIT – III **9**

Socket Options and Elementary UDP Sockets: Socket options: getsocket and setsocket functions – Checking socket options - Socket states - generic socket options – IPV4 socket options – IPV6 Socket options - TCP socket options –Elementary UDP sockets: recvfrom() and sendto() functions - UDP echo Server – UDP echo Client – Lost datagrams – verifying received response and server not running

UNIT – IV **9**

Name and Address Conversions and Raw Sockets: Introduction - Domain Name System – gethostbyname– gethostbyaddr – getservbyname – getservbyport – getaddrinfo - gai_strerror - freeaddrinfo– getaddrinfo for IPv6 – getaddrinfo: Examples - host_serv - tcp_connect - tcp_listen - udp_client - udp_connect - udp_server – getnameinfo - Re-entrant Functions - gethostbyname_r and gethostbyaddr_r functions -Raw socket creation – raw socket output – raw socket input – ping program – trace route program.

UNIT – V **9**

Network Management: Network Management Requirements – Network Management systems – Network Monitoring : Architecture – Performance Monitoring – Fault Monitoring – Accounting Monitoring, Network Control : Configuration Control – Security Control –SNMP Network Management Concepts : Background and Basic Concepts

TOTAL : 45

TEXT BOOKS:

1. Richard Stevens W., Bill Fenner and Andrew M. Rudoff, "Unix Network Programming : The Sockets Networking API ", Volume I, 3rd Edition, Addison Wesley, 2014.
2. William Stallings, "SNMP, SNMPv2, SNMPv3 and RMON 1 and 2", 3rd Edition, PHI/Pearson Education, 2009.

REFERENCE BOOKS:

1. Comer D.E., "Internetworking with TCP/IP Volume - III", (BSD Sockets Version), 2nd Edition, Prentice Hall of India, New Delhi, 2003.
2. Mani Subramaniam, "Network Management: Principles and Practice", 1st Edition, Addison Wesley, 2001.

Course Outcomes:

On completion of the course the students will be able to

- describe and apply the TCP and UDP sockets API
- design and develop TCP and UDP client and server applications
- explain how communication works in data networks and the internet
- develop new network-aware and client-server applications
- outline the major issues in network management

14CST61 COMPILER DESIGN

(Common to CSE & IT branches)

3 1 0 4

Pre-requisites: Basic knowledge in Finite Automata, Regular Expression and Context Free Grammar(CFG)

UNIT – I **9**

Introduction and Lexical Analysis: Language processors – Structure of a compiler – Role of lexical analyzer – Input buffering – Specification of tokens – Recognition of tokens – Lexical analyzer generator (Lex) – Finite Automata – Regular Expression to Automata.

UNIT – II **9**

Parsing: Introduction – Context Free Grammars - Writing a grammar – Top down parsing - Bottom up parsing –Introduction to LR Parsing: Simple LR – More powerful LR Parsers - Parser generators (YACC).

UNIT – III **9**

Intermediate Code Generation: Variants of syntax trees – Three address code – Types and declarations – Translation of expressions – Control flow – Backpatching – Switch statements- Intermediated code for procedures.

UNIT – IV **9**

Code Optimization and Generation: Issues in the design of code generator – The target language – Basic blocks and flow graphs – Optimization of basic blocks – Loops in flow graphs – A simple code generator – Peephole optimization - Principal sources of optimization – Introduction to data-flow analysis.

UNIT – V **9**

Run-time Environments: Storage organization – Stack allocation of space – Addresses in the target code – Access to non-local data on the stack – Heap management – Introduction to garbage collection.

Lecture: 45, Tutorial:15, TOTAL: 60

TEXT BOOKS:

1. Aho Alfred, Sethi Ravi and Ullman Jeffrey D., “Compilers: Principles, Techniques and Tools”, 2nd Edition, Pearson Education Pvt. Ltd., Singapore, 2008.

REFERENCE BOOKS:

1. Srikant Y.N. and Priti Shankar, “The Compiler Design Handbook: Optimizations and Machine Code Generation”, 2nd Edition, CRC Press, 2007.
2. Keith Cooper and Linda Torczon, “Engineering a Compiler”, 2nd Edition, Morgan Kauffman Publishers, 2004.
3. Alexander Meduna, “Elements of Compiler Design”, Auerbach Publications, 2008.
4. Holub Allen I., “Compiler Design in C”, Prentice Hall of India, New Delhi, 2003.

Course Outcomes:

On completion of the course the students will be able to

- apply the LEX tool & YACC tool to develop a scanner and parser
- exploit regular expressions and context free grammars to construct tokens and parse trees
- develop a system for generating a intermediate language of a compiler
- optimize the code by applying several techniques to improve the performance of a program in terms of speed and space
- compare the features of modern programming languages for generation of target language

14CSC61 GRAPHICS AND MULTIMEDIA

(Common to CSE & IT branches)

3 0 2 4

Pre-requisites: Mathematics I

UNIT – I **9**

Introduction to Graphics: Introduction - Graphics applications -Graphics systems – Output Primitive: Line, Circle and Ellipse drawing algorithms – Attributes of Output Primitives

UNIT – II **9**

Two Dimensional Modeling: Two Dimensional Geometric Transformations – Two Dimensional Clipping and Viewing – Structures and Hierarchical Modeling.

UNIT – III **9**

Three Dimensional Modeling: Three dimensional geometric and modeling transformations - Visible surface detection methods - Color models and Color applications

UNIT – IV **9**

Introduction to Multimedia: Introduction – Uses of Multimedia – Interaction Technologies and Devices – Text – Digital Images

UNIT – V **9**

Animation: Digital Audio – Audio-Visual Media: Video and Animation – Creating Animation in Flash – Designing Multimedia

Lecture: 45, Practical: 15, TOTAL: 60

TEXT BOOKS:

1. Hearn Donald and Baker M. Pauline, "Computer Graphics C Version", 2nd Edition, Pearson Education, 2008
2. Ashok Banerji and Ananda Mohan Ghosh, "Multimedia Technologies", 1st Edition, Tata McGraw Hill, 2010.

REFERENCE BOOKS:

1. Jeffcoate, Judith, "Multimedia in Practice: Technology and Applications", 1st Edition, Prentice Hall of India, 2007.
2. Foley James D., Van Dam, Andries, Feiner Steven K. and Hughes John F., "Computer Graphics: Principles and Practice", 2nd Edition, Pearson Education, 2005.
3. http://www.entheosweb.com/Flash/default.asp

Course Outcomes:

On completion of the course the students will be able to

- outline the fundamental concepts of computer graphics and the components that constitute 2D and 3D graphics
- manipulate 2D and 3D objects by applying transformation, clipping, and viewing operations
- identify multimedia applications and manipulate multimedia objects
- develop 2D animations using multimedia components
- identify the different phases for designing multimedia projects

14ITL61 NETWORK PROGRAMMING LABORATORY

(Common to IT & CSE branches)

0 0 3 1

LIST OF EXPERIMENTS /EXERCISES:

1. Create socket and display socket ID
2. Implementation of Address Conversion Routines
3. Develop a Client – Server application for chat using TCP
4. Implementation of UDP Client Server Communication using Bind, SendTo, and RecvFrom System Calls
5. Design TCP Client and Server application to transfer file
6. Demonstration to generate SIGPIPE Error with Socket
7. Demonstration to restart server by capturing SIGHUP signal
8. Develop a code for ping and trace route programs
9. Performance analysis of TCP/UDP using simulation tool
10. Simulation of LAN(CSMA/CD) using simulation tool
11. Simulation of Distance vector / Link State routing protocol
12. Simulation and Performance analysis of 802.11 with AODV,DSR, DSDV routing protocols using simulation tool

TOTAL : 45

REFERENCES / MANUALS / SOFTWARE:

1. Linux Operating System
2. C Compiler, NS2, awk, Xgraph

Course Outcomes:

On completion of the course the students will be able to

- develop socket API based program and implement client-server application using TCP and UDP sockets
- identify different signal handling functions and use them
- use simulation tools to understand wired and wireless functionalities

14EGL41 COMMUNICATION SKILLS LABORATORY

(Common to all Engineering and Technology branches)

0 0 3 1

LIST OF EXPERIMENTS:

1. Listening Skills: Listening activity using software package in the communication laboratory - Listening to native speakers - Developing oral communication by imitating the model dialogues. Listening for specific information – Listening to improve pronunciation – Listening and typing – Filling the blanks–TV programmes and News.

Audio Visual Lab: Activity based learning

2. Activity based Reading Skills: Reading for getting information and understanding; scanning, skimming and identifying topic sentences – Reading for gaining knowledge-Group activity.

3. Activity based Writing Skills: Preparing a draft – Word editing features, editing and proof reading; Writing a short essay using the draft prepared - Group activity.

4. Speaking Skills: Verbal and Non-Verbal Communication; Introducing oneself -Describing a place, Expressing views and opinions; Giving a presentation on a Topic - eye contact, speaking audibly, clearly and with confidence; Group discussion.Conversations – Face-to-Face conversation – Simulated Telephonic Conversation.

Career Lab

5. Interview Skills: Introducing oneself – Answering other FAQ's. Presentation Skills: Elements and structure of effective presentation – Presentation Tools – Voice modulation – Body language –Video samples. Group Discussion: Structure of Group Discussion – Strategies in group discussion - Team work – Video Samples. Soft Skills: Fundamentals of Soft Skills – Work Place Culture and Inter-Personal Relationships.

TOTAL : 45

REFERENCES / MANUALS / SOFTWARE:

1. Orell Digital Language Lab Software

Course Outcomes:

On completion of the course the students will be able to

- communicate efficiently in real life and career related situations
- demonstrate good Presentation skills and team skills
- familiarize in using modern communication software packages to enhance their soft skills

14CSL61 COMPILER DESIGN LABORATORY

(Common to CSE & IT branches)

0 0 3 1

LIST OF EXPERIMENTS /EXERCISES:

1. Implement the concept of Lexical analysis using LEX.
2. Compute ε-closure and simulate an NFA.
3. Implement an algorithm to convert ε-NFA into DFA.
4. Construct a predictive parsing table and simulate it.
5. Evaluate an arithmetic expressions using YACC.
6. Translate arithmetic expressions into an equivalent three-address code.
7. Optimization of three address codes using any two principle sources of optimization techniques.
8. Generate an equivalent target code (Assembly Language) from optimized three address codes.
9. Study of Low Level Virtual Machine (LLVM) compiler.
10. Case Study

TOTAL: 45

REFERENCES / MANUALS / SOFTWARE:

1. Linux /Windows Operating System
2. C / C++ / Java Compiler
3. YACC and LEX tools

Course Outcomes:

On completion of the course the students will be able to

- evaluate the performance of lexical analysis and syntax analysis
- summarize the complexity of intermediate code generators
- construct methods to identify patterns, tokens using regular expressions and CFG
- implement different schemes / ways for code optimization
- evaluate the knowledge of modern programming languages for generating target language

14GET71 TOTAL QUALITY MANAGEMENT

(Common to all Engineering and Technology branches)

3 0 0 3

UNIT – I **9**

Quality (Basic concepts and principles) : Definition of Quality, Dimensions of Quality, Quality Planning, Quality costs, Basic concepts of Total Quality Management, Historical Review. Principles of TQM, Leadership – Concepts, Quality Council, Quality Statements, Strategic Planning, Deming Philosophy, Barriers to TQM Implementation.

UNIT – II **9**

TQM Principles and strategies : Customer satisfaction – Customer Perception of Quality, Customer Complaints, Customer Retention, Employee Involvement – Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits. Continuous Process Improvement – Juran Trilogy, PDSA Cycle, 5S, Kaizen, Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development

UNIT – III **9**

TQM Tools (Process Control): The seven tools of quality, Statistical Fundamentals – Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Process capability, Concept of six sigma, New seven Management tools.

UNIT – IV **9**

TQM Tools: Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, FMEA – Stages of FMEA, Poka Yoke.

UNIT – V **9**

Quality Systems -Need for ISO 9000 and Other Quality Systems, ISO 9000:2008 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, Introduction to TS 16949, QS 9000, ISO 14000, ISO 18000, ISO 20000, ISO 22000.

TOTAL : 45

TEXT BOOKS:

1. Besterfield, Dale H. et al., "Total Quality Management", 3rd Edition (Revised), Pearson Education, 2011.
2. Subburaj Ramasamy, "Total Quality Management", Tata McGraw Hill, New Delhi, 2008.

REFERENCE BOOKS:

1. Feigenbaum A.V., "Total Quality Management", 4th Edition, Tata McGraw Hill, New Delhi, 2004.
2. Suganthi L. and Samuel A. Anand, "Total Quality Management", PHI Learning, New Delhi, 2011.
3. Evans James R. and Lindsay William M., "The Management and Control of Quality", 7th Edition, South-Western (Thomson Learning), 2011.

Course Outcomes:

On completion of the course the students will be able to

- understand the meaning of quality and its importance
- know the principles of total quality management and peculiarities of their implementation
- develop in-depth knowledge on various tools and techniques of quality management
- learn the applications of quality tools and techniques in both manufacturing and service industry
- develop analytical skills for investigating and analyzing quality management issues in the industry and suggest implement able solutions to those

14CST71 MACHINE LEARNING

3 1 0 4

UNIT – I **9**

Introduction: Learning Problems - Designing a Learning System - Perspectives and Issues in Machine Learning – Concept Learning – task – search – finding maximally specific Hypotheses – version spaces and candidate elimination algorithm-inductive bias.

UNIT – II **9**

Decision Tree Learning and Artificial Neural Networks: Decision Tree Representation – Problems – basic decision tree learning algorithms – hypotheses search – Issues – Artificial Neural Networks: Introduction – Representations – Problems – Perceptrons – Multilayer networks and Back Propagation Algorithm – example.

UNIT – III **9**

Bayesian Learning: Bayes Theorem – Concept Learning – Maximum Likelihood and Least-Squared Error Hypothesis - Maximum Likelihood Hypotheses for Predicting Probabilities - Bayes Optimal Classifier - Gibbs Algorithm - Naïve Bayes Classifier – Example.

UNIT – IV **9**

Instance Based Learning and Genetic Algorithm: Introduction – k-Nearest Neighbour Learning – Locally Weighted Regression - Radial Basis Functions - Case-Based Reasoning. Genetic Algorithm – Example – Hypothesis Space Search – Genetic Programming- Models of Evolution and Learning – Parallelizing Genetic Algorithms.

UNIT - V **9**

Learning Sets of Rules: Learning sets of rules: Introduction – sequential covering algorithms – First order rules – FOIL – Induction as Inverted deduction – inverting resolution – Reinforcement learning – Introduction – Learning task – Q learning

Lecture:45, Tutorial: 15, TOTAL: 60

TEXT BOOKS:

1. Tom M. Mitchell, "Machine Learning", Indian Edition, McGraw-Hill Education (India), 2013.

REFERENCE BOOKS:

1. Simon Rogeres and Mark Girolami, "A First Course in Machine Learning", CRC Press, 2015.
2. Ethem Alpaydin, "Introduction to Machine Learning", 3rd Edition, Prentice Hall India, 2015.
3. Christpoher M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2006.

Course Outcomes:

On completion of the course the students will be able to

- identify the perspectives of machine learning
- apply decision tree and Artificial neural networks for real world problems
- design a Bayesian classifier for solving a problem
- illustrate the principles of instance based learning and genetic algorithm
- describe the algorithms for rule and reinforcement learning

14CST72 MOBILE COMMUNICATION

(Common to CSE & IT branches)

3 0 0 3

Pre-requisites: Basic knowledge about data communication such as concepts of modulation, error correction code as well as networking concepts such as TCP/IP protocols.

UNIT – I **9**

Wireless communication: Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Spread spectrum –cellular systems- MAC-Motivation – SDMA – FDMA – TDMA – CDMA

UNIT – II **9**

Telecommunication Systems: Tele Communications – GSM: Mobile services - System architecture - Radio interface - Protocols - Localization and calling – Handover - Security - New data services– Satellite Systems – Basics – Routing - Localization-Handover.

UNIT – III **9**

Wireless Networks: Wireless LAN - Infrared Vs Radio Transmission – Infrastructure Networks and Adhoc Networks - IEEE 802.11 – HIPERLAN: HIPERLAN1 – Bluetooth-User scenarios-Architecture.

UNIT – IV **9**

Mobile Network and Transport Layer: Mobile IP –Dynamic Host Configuration Protocol-Mobile ad-hoc Networks –Improvement on TCP for mobile and wireless network

UNIT – V **9**

Mobile Platforms and Application Layer: WAP-Architecture-Wireless application environment– Mobile Device Operating Systems: Special constraints and Requirements-Commercial mobile Operating System: Windows Mobile, Palm OS, iOS,Android, BlackBerry

TOTAL: 45

TEXT BOOKS:

1. Schiller J., "Mobile Communication", 2nd Edition, Pearson Education, New Delhi, 2014.
2. Prasant Kumar Pattnaik, RajibMall, "Fundamentals of Mobile Computing", PHI Learning Pvt. Ltd., New Delhi, 2012.

REFERENCE BOOKS:

1. Asoke K. Talukdar, "Mobile Computing", 2nd Edition , Tata McGraw Hill, 2010.
2. Theodore S. Rappaport, "Wireless Communications: Principles and Practice", 2nd Edition, Pearson Education, 2014.
3. Hansmann Uwe, Merk Lothar, Nicklons Martin S. and Stober Thomas, "Principles of Mobile Computing", 2nd Edition, Apress / Springer (India) Pvt. Ltd., 2013.
4. Stallings William, "Wireless Communication and Networks", Prentice Hall of India, New Delhi, 2007.

Course Outcomes:

On completion of the course the students will be able to

- recognize the fundamental concepts in wireless transmission and articulate the working principles of telecommunication systems
- express the concepts and features of satellite, broadcast and Wireless LAN systems
- summarize the concepts and issues in the mobile TCP/IP techniques
- explain the architecture of WAP and its use to access the web contents through mobiles
- describe the commercial mobile operating systems and their features

14CSL71 MACHINE LEARNING ALGORITHM LABORATORY

0 0 3 1

LIST OF EXPERIMENTS /EXERCISES:

1. Write a Java program to find the maximum likelihood hypothesis of the given data
2. Write a Java program to implement Naive Bayesian classification and predict the class label for the given data using
3. Write a Java program to find the attribute with maximum information gain for the given data
4. Write a Java program to find the attribute with maximum gain ratio for the given data set
5. Write a Java program to group the given data using k-means clustering
6. Write a Java program to implement linear regression

The following exercises are to be done using WEKA tool

1. Apply Naive bayes classification algorithm for the given data
2. Apply Linear regression algorithm for the given data
3. Apply any two classification algorithms for the given data and evaluate the models based on acuracy and other measures
4. Apply k-means clustering algorithm for the given data and visualize and interpret the results

TOTAL: 45

REFERENCES / MANUALS / SOFTWARE:

1. Windows/Linux Operating System
2. Java, WEKA machine learning tool

Course Outcomes:

On completion of the course the students will be able to

- determine maximum likelihood hypothesis
- implement attribute selection measures like information gain and gain ratio
- implement clustering algorithm to group the given data
- implement linear regression for the given data

14CSL72 MOBILE COMMUNICATION LABORATORY

(Common to CSE & IT branches)

0 0 3 1

LIST OF EXPERIMENTS /EXERCISES:

1. Experiments on GSM / GPRS
   - Basic AT Commands
   - Voice calls / Voice communication
   - Simple Message Service
2. Experiments on GSM / GPRS
   - Phone book : Dial Contact, Delete Contact, Add contact
   - Mobile station call experiment, Mobile station called experiment
   - GPRS : Sending and receiving file over FTP
3. Experiments using ZigBee
   - Data communication between co-ordinator and device module
4. Experiments using WiFi
   - Point-to-Point Communication between two nodes in the network
   - Broadcast Communication from one node to all other nodes.
   - Experiments on interfacing WiFi mote
5. Experiments on IoT
   - Experiments on interfacing with UbiSense
6. Experiments on IoT
   - IP based sensor monitoring through UbiSense
7. Experiments on interfacing BLE mote
8. Experiments on CDMA
   - Spread spectrum and de-spread spectrum
9. Experiments using J2ME/WML
   - Design of simple Calculator, Calendar and simple game using WML/J2ME
10. Animate an image using WML/J2ME and Browsing the Internet using Mobile phone simulator

TOTAL: 45

REFERENCES / MANUALS / SOFTWARE/HARDWARE:

1. Development Kits for GSM/GPRS, ZigBee, WiFi, Bluetooth, IoT, CDMA
2. Software Kit : J2ME/WML Tool Kit

Course Outcomes:

On completion of the course the students will be able to

- describe the working of various mobile communication systems
- develop and conduct simple real time experiments
- simulate simple wireless networks and analyze the performance
- develop mobile apps for simple applications
- apply the principles and technique to communication systems design or undertake further research

14GET81 PROFESSIONAL ETHICS AND HUMAN VALUES

(Common to all Engineering and Technology branches)

3 0 0 3

UNIT – I **9**

Understanding: Morals – Values-Ethics– Honesty – Integrity – Work Ethic – Service Learning – Civic Virtue – caring – Sharing – Courage – Valuing Time – Co-operation – Commitment – Empathy –Self-Confidence – Character – Spirituality-Senses of 'Engineering Ethics' - variety of moral issues - types of inquiry.

UNIT – II **9**

Moral dilemmas – moral autonomy – Kohlberg's theory – Gilligan's theory – consensus and controversy – Models of Professional Roles – theories about right action – Self-interest – customs and religion- uses of ethical theories. Meaning of Engineering experimentation - engineers as responsible experimenters.

UNIT – III **9**

Codes of ethics for engineers - a balanced outlook on law - the challenger case study. Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk, Bhobal Gas Tragedy and Chernobyl case studies.

UNIT – IV **9**

Collegiality and loyalty – respect for authority – collective bargaining – confidentiality – conflicts of interest – occupational crime – professional rights – employee rights – discrimination – Intellectual Property Rights (IPR) – Multinational corporations – Environmental ethics.

UNIT – V **9**

Computer ethics – weapons development-engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership-sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of Electronics and Telecommunication Engineers(IETE).

TOTAL : 45

TEXT BOOKS:

1. Martin Mike and Schinzinger Roland, "Ethics in Engineering", 4th Edtion, Tata McGraw-Hill, New Delhi, 2014.
2. Govindarajan M., Natarajan S., and Senthil Kumar V.S., "Engineering Ethics", Prentice Hall of India, New Delhi, Reprint 2013.

REFERENCE BOOKS:

1. Fleddermann Charles D., "Engineering Ethics", 4th Edition, Pearson Education/Prentice Hall, New Jersey, 2014.
2. Harris Charles E., Protchard Michael S. and Rabins Michael J., "Engineering Ethics: Concepts and Cases", 4th Edition Wadsworth Thompson Learning, United States, 2008.
3. Seebauer Edmund G. and Barry Robert L., "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2008.

Course Outcomes:

On completion of the course the students will be able to

- understand the components of ethics and values
- understand the knowledge interpersonal and organizational issues in ethics
- acquire knowledge on ethical theories and their application
- highlight ethical issues in risky situation
- understand the role of professional bodies

14MAE01 LINEAR PROGRAMMING

3 1 0 4

UNIT – I **9**

Introduction to LPP: Introduction – Formulation of Linear Programming Problem – Advantages of Linear Programming methods – Limitations of Linear Programming models – Standard form of LPP – Graphical Method – Simplex Method – Artificial variable techniques – Big M Method – Two Phase method.

UNIT – II **9**

Duality and Sensitivity Analysis: Definition of the dual problem – Primal-dual relationships – Dual simplex Method – Duality – Sensitivity Analysis – Change in Objective function coefficient – Change in availability of resources – Addition of a new variable – Addition of a new Constraint.

UNIT – III **9**

Transportation and Assignment Problems: Mathematical Formulation of Transportation Problem – Initial basic feasible solution – North West Corner Method – Least Cost Method – Vogel's approximation method – Optimal solution – MODI Method – Degeneracy – Assignment problem – Hungarian Method.

UNIT – IV **9**

Integer Linear Programming: Introduction – Types of Integer programming problems – Pure Integer Programming Problems – Gomary's Cutting Plane method – Mixed Integer Programming – Gomary's Mixed Integer Cutting Plane method – Branch and Bound method.

UNIT – V **9**

Dynamic Programming: Introduction – Bellman's principle of Optimality – Characteristics and applications of Dynamic programming – Solution of Dynamic programming problems – Backward and forward induction process – Dynamic programming algorithm – Solution of LPP by Dynamic programming.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOKS:

1. Taha H.A., "Operations Research", 9th Edition, Pearson Education, India, 2012.
2. Kanti Swarup, Gupta P.K. and Man Mohan, "Operation Research", 8th Edition, Sultan Chand & Sons, New Delhi, 1999.

REFERENCE BOOKS:

1. Sharma J.K., "Operations Research: Theory and Applications", 5th Edition, Macmillan, 2012.
2. Hillier S., Lieberman, " Introduction to Operation Research", 9th Edition, McGraw Hill, 2012.
3. Panneerselvam R., "Operations Research", 2nd Edition, Prentice Hall of India, 2011.
4. Gupta P.K. and Hira D.S., "Operations Research : An Introduction", 6th Edition, S.Chand and Co. Ltd., New Delhi, 2008.
5. Sundaresan V., Ganapathy Subramaniyam K.S., Ganesan K., "Resource Management Techniques", A.R. Publications, 2009.

Course Outcomes:

On completion of the course the students will be able to

- formulate and solve mathematical programming problems
- analyze duality and post optimality which occur in linear programming problems
- solve transportation and assignment problems which appear as special case of mathematical programming
- know the various types and methods of solving integer programming problems
- acquire an idea about the computational procedure of dynamic programming problems

14CSE01 ADVANCED DATABASES

(Common to CSE & IT branches)

3 0 0 3

UNIT - I **9**

Distributed Databases: Distributed DBMS Concepts and Design – Introduction – Functions and Architecture of DDBMS – Distributed Relational Database Design – Transparency in DDBMS – Distributed Transaction Management – Concurrency control – Deadlock Management – Database recovery – The X/Open Distributed Transaction Processing Model –Distributed Query Optimization - Distribution and Replication in Oracle.

UNIT - II **9**

Object Oriented Databases: Object Relational DBMS - Introduction – Weakness of RDBMS – Storing Objects in Relational Databases – Object-Oriented DBMSs-Concepts and Design – Next Generation Database Systems –Introduction – Persistence – Issues in OODBMS – Advantages and Disadvantages of OODBMS – Comparison of ORDBMS and OODBMS – Object Oriented Database Design – OODBMS Standards and Systems – Object Management Group – Object Database Standard ODMG – ObjectStore.

UNIT - III **9**

Web Databases: Web Technology And DBMS – Introduction – The Web – Scripting languages – Common Gateway Interface – HTTP Cookies – Extending the Web Server – Java – Microsoft's Web Solution Platform – Oracle Internet Platform – Semi structured Data and XML – XML Related Technologies – XML Query Languages

UNIT - IV **9**

Intelligent Databases: Enhanced Data Models For Advanced Applications – Active Database Concepts And Triggers – Generalized Model for active databases – Design and Implementation issues-Examples and applications - Temporal Database Concepts – Time representation, Calendars and Time dimensions–Tuple versioning – Attribute versioning- Multimedia databases - Deductive databases .

UNIT V **9**

Current Trends: Spatial Databases – Data Warehousing – Data Mining– NOSQL Databases – Big Data Storage Systems– Big Data Technologies– MapReduce– Hadoop.

TOTAL: 45

TEXT BOOKS:

1. Connolly Thomas M. and Begg Carolyn E., "Database Systems: A Practical Approach to Design , Implementation and Management", 6th Edition, Pearson Education, New Delhi, 2014.
2. Elmasri Ramez and Navathe, Shamkant B, "Fundamentals of Database Systems", 7th Edition, Pearson Education, New Delhi, 2015.

REFERENCE BOOKS:

1. Ozsu M.Tamer and Ualduriel Patrick, "Principles of Distributed Database Systems", 2nd Edition, Pearson Education, New Delhi, 2003.
2. Prabhu C.S.R., "Object Oriented Database Systems", Prentice Hall of India, New Delhi, 2003.
3. Rob Peter and Coronel Corlos, "Database Systems: Design, Implementation and Management", 5th Edition, Thompson Learning Course Technology, New Delhi, 2003.

Course Outcomes:

On completion of the course the students will be able to

- distinguish between traditional databases and distributed databases
- identify the advantages and disadvantages of OODBMS
- specify the features of web databases
- categorize different types of intelligent databases
- provide an overview of latest trends in databases

14CSE02 ARTIFICIAL INTELLIGENCE

(Common to CSE & IT branches)

3 0 0 3

Pre-requisites: Data Structures, Design and Analysis of Algorithms

Unit – I **9**

Introduction: Definition, Foundations and History. **Intelligent Agents:** Concept of Rationality, Environments and Structure. **Solving Problems by Searching:** Problem-Solving Agents, Example, Searching for Solutions, Search Strategies and constraint Satisfaction Search.

Unit –II **9**

Logical Agents: Knowledge-Based Agents, Wumpus World, Propositional Logic, Propositional Theorem, Propositional Model Checking, Agents Based on Propositional Logic. **First-Order Logic:** Representation, Syntax and Semantics, Using First-Order Logic and Knowledge Engineering. **Inference in First-Order Logic:** Unification and Lifting, Forward and Backward Chaining, Resolution.

Unit – III **9**

Classical Planning: Definition, Algorithm, Planning Graphs and other Approaches. **Planning and Acting:** Time, Schedules, and Resources, Planning and Acting in Nondeterministic Domains, Hierarchical and Multiagent Planning.

Unit – IV **9**

Quantifying Uncertainty: Acting under Uncertainty, Probability Notation, Inference, Independence and Bayes' Rule. **Probabilistic Reasoning:** Semantics and Inference of Bayesian Networks, Relational and First-Order Probability Models, **Probabilistic Reasoning over Time:** Inference, Hidden Markov Models, Kalman Filters and Dynamic Bayesian Networks. **Making Simple Decisions:** Utility Theory and Functions and Decision Networks.

Unit – V **9**

Learning from Examples: Forms, Decision Trees, Theory of Learning, Linear Models, Artificial Neural Networks, Nonparametric Models, Support Vector Machines, Ensemble Learning**. Knowledge in Learning:** Logical Formulation, Explanation-Based Learning, Relevance Information, Inductive Logic Programming**. Reinforcement Learning:** Passive and Active Reinforcement Learning and Generalization

TOTAL: 45

TEXT BOOKS:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", 3rd Edition, Pearson Education, 2013.

REFERENCE BOOKS:

1. Poole D. and Mackworth A., "Artificial Intelligence: Foundations of Computational Agents", 1st Edition, Cambridge University Press, 2010.
2. Brachman R. and Levesque H., "Knowledge Representation and Reasoning", 1st Edition, Morgan Kaufmann, 2004.
3. Luger G., "Artificial Intelligence: Structures and Strategies for Complex Problem Solving", 6th Edition, Addison Wesley, 2008.
4. Alpaydin E., "Introduction to Machine Learning", 2nd Edition, MIT Press, 2010.

Course Outcomes:

On completion of the course the students will be able to

- define intelligent agents and apply searching for solving problem
- interpret the role of logics in AI
- handle uncertainty in real world problems
- build simple knowledge-based systems
- apply knowledge representation, reasoning, and machine learning techniques to real-world problems

14CSE03 ADVANCED JAVA PROGRAMMING

(Common to CSE & IT branches)

3 0 0 3

Pre-requisites: Java Programming

UNIT – I **9**

Java Swing: Introduction - Features - MVC Connection - Components and Containers - Swing Package - Simple Application - Event Handling - Swing Applet - Painting in Swing. Exploring swing: JLabel and ImageIcon – JTextField - Swing Buttons – JTabbedPane – JScrollPane – JList - JComboBox.

UNIT – II **9**

Advanced Swing Components and JDBC: Swing Components: Trees – JTable – Tooltips - Swing Menus: Menu basic - JMenuBar, JMenu, JMenuItem - Main Menu – Mnemonics and Accelerators to menu items - Images and Tooltips to MenuItems – JRadioButtonMenuItem – JCheckBoxMenuItem - Popup Menus – ToolBar - Actions. Java Database Programming: java.sql Package - Database connectivity - Relational databases - JDBC API - Case Study: Payroll system using Swing Components and JDBC.

UNIT – III **9**

Network Programming and RMI: Network Programming **:** Basics - Classes and Interfaces – InetAddress - Factory methods - Instance Methods - Inet4Address and Inet6Address - TCP/IP Client Sockets – URL – URLConnection – HttpURLConnection - URI Class – Cookies - TCP/IP Server sockets – Datagrams - RMI architecture - Developing Simple RMI applications.

UNIT – IV **9**

Servlets: Introduction - HTTP Servlet Basics: Servlet API – Page Generation – Web Applications. Servlet Life Cycle: Servlet Alternatives – Reloading – init and destroy – Single Thread Model – Background Processing – Load on Startup – Client-Side Caching – Server-Side Caching - Retrieving information – Sending HTML information .

UNIT – V **9**

Servlets and JSP: Servlets : Session Tracking : User Authentication – Hidden Form Fields- URL Rewriting – Persistent Cookies- Session Tracking API - Case Study : Login Application using Session tracking. Java Server Pages : Basics - Expression and Declaration – Directives – JSP and Java Beans – Includes and Forwards – Custom Tag libraries- Simple JSP program. Case Study: Resume registration web application using Servlets, JDBC and JSP

TOTAL: 45

TEXT BOOKS:

1. Schildt, Herbert, "Java: The Complete Reference", 9th Edition, Tata McGraw-Hill, New Delhi, 2014.
2. Jason Hunter and William Crawford, "Java Servlet Programming", 2nd Edition, O'Reilly Media, 2010.

REFERENCE BOOKS:

1. Elliotte Rusty Harold, "Java Network Programming", 4th Edition, O'Reilly Media, 2013.
2. Marc Loy, Robert Eckstein, Dave Wood, James Elliott and Brian Cole, "Java Swing", 2nd Edition, O'Reilly Media, 2002.
3 "Java Server Programming – Java EE7 Black Book", Dream Tech Press, 2015.

Course Outcomes:

On completion of the course the students will be able to

- develop Java Swing Applications
- create desktop applications with Database connectivity and Swing
- develop network applications with socket programming
- demonstrate the RMI architecture and its applications
- design server side programs with JSP and Servlets

14MAT41 NUMERICAL METHODS

(Common to Civil, EEE, EIE, ECE, CSE, IT, Chemical & Food Technology)

3 1 0 4

UNIT – I **9**

Solution to Algebraic and Transcendental Equations: Iteration method – Method of false position – Newton-Raphson method – Solution of linear system of equations – Direct methods: Gauss elimination method and Gauss - Jordan method – Iterative methods: Gauss Jacobi and Gauss – Seidel methods.

UNIT – II **9**

Interpolation: Interpolation with equal intervals: Newton's forward and backward difference formulae – Central difference interpolation formulae: Gauss forward and backward interpolation formulae – Interpolation with unequal intervals: Lagrange's interpolation formula – Newton's divided difference formula.

UNIT – III **9**

Numerical Differentiation and Integration: Differentiation using Newton's forward, backward and divided difference formulae – Numerical integration: Trapezoidal rule – Simpsons $1/3^{rd}$ rule – Double integrals using Trapezoidal and Simpson's rules.

UNIT – IV **9**

Numerical Solution of First order Ordinary Differential Equations: Single step methods**:** Taylor series method – Euler method – Modified Euler method – Fourth order Runge-Kutta method – Multi step methods: Milne's predictor corrector method – Adam's Bashforth method.

UNIT – V **9**

Solutions of Boundary Value Problems in PDE: Solution of one dimensional heat equation – Bender -Schmidt recurrence relation – Crank - Nicolson method – One dimensional wave equation – Solution of two dimensional Laplace equations – Solution of Poisson equation.

Lecture: 45, Tutorial: 15, TOTAL: 60

TEXT BOOKS:

1. Kandasamy P., Thilakavathy K. and Gunavathy K., "Numerical Methods", Reprint Edition, S.Chand & Co, New Delhi, 2014.
2. Veerarajan T., Ramachandran T., "Numerical Methods with Programming C", 2^{nd} Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2008.

REFERENCE BOOKS:

1. Balagurusamy E., "Numerical Methods", Reprint Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2007.
2. Jain M.K., Iyengar S.R.K. and Jain R.K., "Numerical Methods for Scientific and Engineering Computation", 6^{th} Reprint, New Age International Pvt. Ltd., New Delhi, 2014.
3. Sankara Rao K., "Numerical Methods for Scientists and Engineers", 3^{rd} Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2008.
4. Gerald C.F. and Wheatley P.O., "Applied Numerical Analysis", 7^{th} Edition, Pearson Education, Asia, New Delhi, 2006.
5. Grewal B.S., "Numerical Methods in Engineering and Science", 9^{th} Edition, Khanna Publishers, 2007.

Course Outcomes:

On completion of the course the students will be able to

- know the various methods of solving algebraic and transcendental equations numerically
- understand the concept of interpolation
- gain knowledge on the concepts of numerical differentiation and integration
- obtain the solution of ordinary differential equations numerically
- apply various numerical techniques in solving complex partial differential equations

14ITE01 DATA WAREHOUSING AND DATA MINING

(Common to IT & CSE branches)

3 0 0 3

Pre-requisites: Database management systems

UNIT – I **9**

Data Warehouse: Data warehouse -basic concepts- Modeling – Design and usage- Implementation – Data generalization by Attribute-oriented induction approach – Data cube computation methods.

UNIT – II **9**

Data Mining: Introduction- Kinds of Data and Patterns–Major issues in data mining- Data Objects and attribute types –Statistical description of data - Measuring data similarity and dissimilarity. Data preprocessing : Overview-Data cleaning- Data integration –Data reduction-Data transformation and discretization.

UNIT – III **9**

Association Rule Mining: Basic concepts- Frequent itemset mining methods : Apriori algorithm- A pattern growth approach for mining frequent itemsets—Pattern evaluation methods- Mining multilevel , multi dimensional space-constraint based frequent pattern mining.

UNIT – IV **9**

Classification: Basic concepts- Decision Tree Induction - Bayes Classification Methods – Rule Based Classification-Model evaluation and selection techniques to improve classification accuracy – Support Vector Machines- Classification using frequent patterns.

UNIT – V **9**

Clustering: Cluster analysis- Partitioning methods- Hierarchical methods- Density based methods – Grid based methods – Model-Based Clustering Methods – Clustering High Dimensional Data- Constraint based Cluster Analysis – Introduction to outlier analysis -Data Mining Applications.

TOTAL: 45

TEXT BOOKS:

1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", 3rd Edition, Elsevier, 2012.

REFERENCE BOOKS:

1. Gupta G.K., "Introduction to Data Mining with Case Studies", Eastern Economy Edition, Prentice Hall of India, 2006.
2. Charu C. Aggarwal, "Data Mining: The Textbook", Kindle Edition, Springer, 2015.
3. Margret H. Dunham, "Data Mining : Introductory and Advanced Topics", 17th Edition, Pearson Education, 2013.

Course Outcomes:

On completion of the course the students will be able to

- design a data warehouse
- apply pre processing techniques
- mine correlation based frequent patterns in large data sets
- compare and contrast the various classifiers
- apply data mining techniques and methods to large data sets

14ITE03 XML AND WEB SERVICES

(Common to IT & CSE branches)

3 0 0 3

UNIT – I **9**

XML: Introduction - XML Basics - XML Document Structure – XML Content Model – Rules of XML Structure- Well Formed and Valid Structure - Namespace in XML - Document Type Definition.

UNIT – II **9**

XML Schema and Parsers: Creating XML Schemas - Document Object Model : DOM Levels – Core – Traversal and Range - SAX : Basics - Packages – Implementation -Validation – Handling errors.

UNIT – III **9**

XML Transformation and Database Integration: XSL Technologies – XSLT – XSL for Business to Business Communication –XSL Formatting Objects. XML Database solutions – Modeling Databases in XML.

UNIT – IV **9**

Web Services: Introduction – Technical motivation – SOA - Architecting Web Service – Web Service Building Block – SOAP: Syntax – Messages – Implementations.

UNIT – V **9**

Web Services Implementation: WSDL - UDDI - Web Service implementation using .NET Framework – Accessing Web Service - Case Study - Temperature Conversion Web Services using AWS.

TOTAL: 45

TEXT BOOKS:

1. Ron Schmelzer, Travis Vandersypen, Jason Bloomberg, Madhu Siddalingaiah, Sam hunting, Michael D. Qualls, David Houlding, Chad Darby and Diane Kennedy, " XML and Web Services: Unleashed ", 4th Edition, Pearson Education, 2011.

REFERENCE BOOKS:

1. Alex Ferrara and Matthew MacDonald, "Programming .NET Web Services", 1st Edition, O'Reilly, 2002.
2. https://aws.amazon.com
3. Erik T. Ray, "Learning XML", 2nd Edition, O'Reilly, 2002.

Course Outcomes:

On completion of the course the students will be able to

- understand the concepts of XML
- explore the validation of XML and parsers in XML
- know the XML transformations and database integration
- explore the Web Services building blocks
- design and implement Web Services

14ITE08 CLOUD COMPUTING

(Common to IT & CSE branches)

3 0 0 3

Pre-requisites: Distributed System / Distributed Computing

UNIT – I **9**

Introduction: Cloud computing at a Glance – Historical Developments – Building Cloud computing Environments –Virtualization: Introduction – Characteristics – Taxonomy – Virtualization and Cloud Computing - Pros and Cons – Technology: Xen – VMware – Microsoft Hyper-V

UNIT – II **9**

Cloud Computing Architecture and Aneka Platform: Cloud Reference Model – Types of Clouds – Economics of the Cloud- Open Challenges – Anatomy of the Aneka container – Building Aneka clouds – Cloud programming and management.

UNIT – III **9**

Cloud Application Programming: Concurrent Computing: Parallelism for single-machine – Programming applications with threads – Multithreading with Aneka – Programming applications with Aneka threads. High-Throughput Computing: Task computing – Task-based application models – Aneka task-based programming.

UNIT – IV **9**

Cloud Platforms and Application: Data Intensive Computing – Aneka Map Reduce Programming, Cloud Platform: Amazon Web Services – Google App Engine – Microsoft Azure. Cloud Applications: Scientific applications – Business and Consumer Applications.

UNIT – V **9**

Advanced Topics: Energy Efficiency in Clouds – Market based Management of Cloud – Federated Clouds / Inter Cloud – Third Party Cloud services.

TOTAL: 45

TEXT BOOKS:

1. Rajkumar Buyya, Christian Vecchiola and Thamarai Selvi S., "Mastering Cloud Computing", McGraw Hill Education(India) Private Limited, 2013.

REFERENCE BOOKS:

1. Rittinghouse John and Ransome James, "Cloud Computing: Implementation, Management, and Security", 1st Edition, CRC Press, 2016.
2. Michael Miller, "Cloud Computing: Web-Based Applications that change the way you work and collaborate online", 1st Edition, QUE Publishing, 2009.
3. Jeorge Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud", 1st Edition, O'Reilly Publications, 2009.
4. Miller F.P., Vandome A.F and Mc Brewster John, "Cloud Computing", 1st Edition, Alphascript Publishing, 2009.
5. Toby Velte, Anthony Velte and Robert Elsenpeter, "Cloud Computing - A Practical Approach", 1st Edition, Tata McGraw Hill, 2010.

Course Outcomes:

On completion of the course the students will be able to

- understand the current trends and basics of cloud computing
- explore the online applications of cloud services
- design various applications by integrating the cloud services
- understand VMware
- explore Aneka

14CSE04 NATURAL LANGUAGE PROCESSING

3 0 0 3

Pre-requisites: Theory of Computation, Artificial Intelligence

Unit – I **9**

Introduction: Basic Knowledge, Ambiguity, Models and Algorithms, Language, Thought, and Understanding, State of the Art and Future, History. **Regular Expressions and Automata:** Regular Expressions, Finite-State Automata, Regular Languages and FSAs

Unit –II **9**

Word Classes and Part-of-Speech Tagging: English Word Classes, Tagsets for English, Part of Speech Tagging, Rule-based and Stochastic, Transformation-Based Tagging, Issues **Context-Free Grammars for English:** Constituency, Context-Free Rules and Trees, Sentence-Level Constructions, The Noun Phrase, Coordination, Agreement, The Verb Phrase and Subcategorization, Auxiliaries, Spoken Language Syntax, Grammar Equivalence and Normal Form, Finite State and Context-Free Grammars, Grammars & Human Processing. **Parsing with Context-Free Grammar:** Parsing as Search, Basic Top-down Parser, Problems with the Basic Top-down Parser, Earley Algorithm, Finite-State Parsing Methods.

Unit – III **9**

Features and Unification: Feature Structures, Unification of Feature Structures, Features Structures in the Grammar, Implementing Unification, Parsing with Unification Constraints, Types and Inheritance. **Lexicalized and Probabilistic Parsing:** Probabilistic Context-Free Grammars (PCFGs), Problems, Probabilistic Lexicalized CFGs, Dependency Grammars, Human Parsing.

Unit – IV **9**

Representing Meaning: Computational Desiderata for Representations, Meaning Structure of Language, First Order Predicate Calculus, Linguistically Relevant Concepts, Related Representational Approaches, Alternative Approaches to Meaning. **Semantic Analysis:** Syntax-Driven Semantic Analysis, Attachments for a Fragment of English, Integrating Semantic Analysis into the Earley Parser, Idioms and Compositionality, Robust Semantic Analysis.

Unit – V **9**

Lexical Semantics: Relations Among Lexemes and Their Senses, WordNet, The Internal Structure of Words, Creativity and the Lexicon. **Word Sense Disambiguation and Information Retrieval:** Selection Restriction-Based Disambiguation, Robust Word Sense, Information Retrieval and its task.

TOTAL: 45

TEXT BOOKS:

1. Daniel Jurafsky and James H. Martin, "Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition", 2nd Edition, Prentice-Hall, 2009.

REFERENCE BOOKS:

1. Christopher D. Manning and Hinrich Schütze, " Foundations of Statistical Natural Language Processing", 6th Edition, MIT Press, 1999.
2. James Allen, " Natural Language Understanding", 2nd Edition, The Benajmins/Cummings Publishing Company Inc., 1994.
3. Charniak E., "Statistical Language Learning", 1st Edition, The MIT Press, 1996.
4. Patrick Blackburn and Johan Bos, "Representation and Inference for Natural Language - A First Course in Computational Semantics", CSLI Publications, Stanford, CA, 2005.

Course Outcomes:

On completion of the course the students will be able to

- describe the concepts related to processing of words
- identify different techniques for syntactic processing of a Natural Language
- explain advanced syntactic parsing techniques in NLP
- discuss several approaches to compositional semantic analysis
- use word sense disambiguation in information retrieval and other applications

14CSE05 REAL TIME COMPUTING AND COMMUNICATION

3 0 0 3

Pre-requisites: Distributed Systems, Operating System and Computer Networks

UNIT – I **9**

Introduction: Real-time systems – Applications – Basic Model – Characteristics – Safety and Reliability – Types of Real Time tasks – Timing Constraints – Modelling Timing Constraints. **Scheduling Real Time tasks :** Concepts – Types of Real Time Tasks and their Characteristics – Task Scheduling – Clock-Driven Scheduling – Hybrid Schedulers - Event-Driven Scheduling – EDF Scheduling – Rate Monitoring Algorithm (RMA) – Issues with RMA – Issues in Using RMA in Practical Situations

UNIT – II **9**

Resource Sharing among Real Time Tasks and Scheduling Real Time Tasks: Resource Sharing Among RT Tasks – Priority Inversion – PIP – HLP – PCP – Types of Priority Inversions Under PCP – Features of PCP – Issues in using Resource Sharing Protocol – Handling Task Dependencies – Multiprocessor Task Allocation – Dynamic Allocation of Tasks – Fault Tolerant Scheduling of Tasks – Clocks in Distributed RT Systems – Centralized and Distributed Clock Synchronization.

UNIT – III **9**

Task Scheduling in Multiprocessor Real Time Systems: Task Scheduling results for multiprocessor systems – Priority-Driven preemptive scheduling approach – Static Table-Driven scheduling approach, Dynamic planning-based scheduling approach, Dynamic Best-Effort scheduling approach, Real Time scheduling with feedback control.

UNIT – IV **9**

Resource Reclaiming and Fault-tolerant Scheduling in Multiprocessor Real Time Systems: Scheduler model, motivations, Properties of resource reclaiming algorithms, Task Model, Resource reclaiming algorithms, Resource reclaiming from Resource-Constrained and Resource-and-Precedence Constrained tasks, Evaluation of resource reclaiming algorithms, Fault classification, Fault tolerance in real time systems, fault tolerant scheduling algorithms.

UNIT – V **9**

Real Time Communication: Examples of Applications Requiring Real Time Communication – Basic Concepts – Real Time Communication in a LAN – Soft and Hard Real Time Communication in a LAN – Bounded Access Protocols for LANs – Performance Comparison – Real Time Communication Over Packet Switched Networks – QoS Framework – Routing – Resource Reservation – Rate Control – QoS Models

TOTAL: 45

TEXT BOOKS:

1. Rajib Mall, "Real-Time Systems: Theory and Practice", 2nd Reprint, Pearson Education India, 2009.
2. Siva Ram Murthy C. and Manimaran G., "Resource Management in Real-time Systems and Networks", MIT Press, March 2001.

REFERENCE BOOKS:

1. Jane W. Liu, "Real-Time Systems", 8th Reprint, Pearson Education, 2001.
2. Alan C. Shaw, "Real-Time Systems and Software", Wiley, 2001.
3. Philip Laplante, "Real-Time Systems Design and Analysis", 3rd Edition, John Wiley & Sons, 2004.

Course Outcomes:

On completion of the course the students will be able to

- outline the basic concepts of real time systems
- analyze the various scheduling algorithms used in uniprocessor and multiprocessor environment
- explain the model for dynamic scheduling of tasks, the need for resource reclaiming and the algorithms for resource reclaiming
- identify the types of fault in real time systems and the fault-tolerant algorithms used for handling the faults
- summarize the concepts and the role of different protocols in real time communication

14ITT71 CRYPTOGRAPHY AND NETWORK SECURITY

(Common to IT & CSE branches)

3 1 0 4

Pre-requisites: Computer Communication Networks

UNIT – I **9**

Introduction and Number Theory: Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, Stream and block cipher techniques)- Number theory:Modular arithmetic-Euclid's algorithm–Random number generation- Fermat's and Euler's theorems - Prime numbers - Testing for primality -The Chinese remainder theorem- Discrete logarithms.

UNIT – II **9**

Symmetric Key Cryptography: Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm- Security of RSA-Key management - Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

UNIT – III **9**

Hash Functions and Digital Signatures: Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 - SHA - HMAC – CMAC - Digital signature and authentication protocols : RSAPSS –DSA – DSS – EIGamal – Schnorr - ECDSA.

UNIT – IV **9**

Security Practice and System Security: Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - Firewalls design principles – Trusted systems - Intruder: Intrusion detection system – Types of Intrusion detection system - Virus and related threats – Countermeasures.

UNIT – V **9**

E-Mail Security: Pretty Good Privacy(PGP) - S/MIME. IPSecurity: Overview of IPSec - IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). Web Security: SSL/TLS Basic Protocol-computing the keys - client authentication-PKI as deployed by SSL - SET for E-Commerce Transactions

Lecture:45, Tutorial:15, TOTAL: 60

TEXT BOOKS:

1. William Stallings, "Cryptography and Network Security", 6th Edition, Pearson Education, 2013.
2. Behrouz A. Ferouzan, Debdeep Mukhopadhyay,"Cryptography and Network Security", 2nd Edition, Tata Mc Graw Hill, 2010.

REFERENCE BOOKS:

1. Charles P Fleeger, "Security in Computing", 4th Edition, Prentice Hall of India, 2006.
2. Man Young Rhee, "Internet Security: Cryptographic Principles, Algorithms and Protocols", 1st Edition, Wiley Publications, 2003.
3. Bruce Schneier and Neils Ferguson, "Practical Cryptography", 1st Edition, Wiley Dreamtech India Pvt. Ltd., 2003.
4. Douglas R. Simson, "Cryptography – Theory and Practice", 1st Edition, CRC Press, 1995.
5. http://nptel.ac.in

Course Outcomes:

On completion of the course the students will be able to

- understand OSI security architecture and classical encryption techniques
- understand the information flow and architecture
- acquire the concepts like Information theory and decision making
- know the information system application
- gain the knowledge of development and maintenance of information systems

14CSE06 SOFTWARE TESTING

(Common to CSE & IT branches)

3 0 0 3

Pre-requisites: Software Engineering

UNIT – I **9**

Basics of Software Testing: Introduction-definition-approaches-Essentials of software –Important Features of testing process-principles of software testing-salient features of good testing-testing strategy-challenges-test team approach-process problems faced by testing-cost of testing-categories of defect-developing testing methodology-testing process-testing methodologies

UNIT – II **9**

Software Testing Environment: Assessing Capabilities, Staff Competency, and User Satisfaction-Creating an environment supportive of software testing - Building the software testing process

UNIT – III **9**

Testing Process: Overview of the Software Testing process- The Seven-Step Software Testing Process-Organizing for testing-Workbench-Procedure -Developing the test plan- Workbench-Procedure

UNIT – IV **9**

Testing Process: Verification testing- Workbench-Procedure -Validation testing- Workbench-Procedure Analyzing and reporting test results- Workbench-Procedure

UNIT – V **9**

Incorporating Specialized Testing Responsibilities: Testing client/server systems- Testing software system security -Testing web-based systems -Using Agile Methods to Improve Software Testing

TOTAL: 45

TEXT BOOKS:

1. Perry William, "Effective Methods for Software Testing", 3rd Edition, Wiley India, Reprint 2013.
2. Limaye M.G., "Software Testing - Principles, Techniques and Tools", 1st Reprint, Tata McGraw-Hill, 2009.

REFERENCE BOOKS:

1. Rajani Renu and Oak Pradeep, "Software Testing Effective Methods: Tools and Techniques", Tata McGraw-Hill, New Delhi, 2006.
2. Kit Edward, "Software Testing in the Real World: Improving the Process", 3rd Impression, Pearson Education, New Delhi, 2005.

Course Outcomes:

On completion of the course the students will be able to

- identify the step by step activities and set up environment for software testing
- express the procedure to develop test plan and analyze as well as report the test results
- demonstrate the process of testing the various modules of the application
- apply software testing for client server and web based systems
- point out the agile methods to improve testing

14CSE07 SOCIAL NETWORK ANALYSIS

(Common to CSE & IT branches)

3 0 0 3

Pre-requisites: Data Mining

UNIT - I **9**

Introduction: Statistical Properties of Social Networks– Preliminaries– Static Properties - Dynamic Properties – Random Walks on Graphs: Background – Random Walk based Proximity Measures - Other Graph-based Proximity Measures - Graph-theoretic Measures for Semi-supervised Learning - Clustering with random walk based measures

UNIT - II **9**

Community Discovery: Communities in Context - Core Methods: Quality Functions - The Kernighan-Lin(KL) algorithm - Agglomerative/Divisive Algorithms - Spectral Algorithms - Multi-level Graph Partitioning - Markov Clustering - **Node Classification in Social Networks:** Problem Formulation - Methods using Local Classifiers - Random Walk based Methods - Applying Node Classification to Large Social Networks

UNIT - III **9**

Social Influence Analysis: Influence Related Statistics - Social Similarity and Influence - Influence Maximization in Viral Marketing- Expert Location in Social Networks: Expert Location without Graph Constraints - Expert Location with Score Propagation

UNIT - IV **9**

Link Prediction In Social Networks: Feature based Link Prediction : Feature Set Construction - Classification Models - Bayesian Probabilistic Models: - Link Prediction by Local Probabilistic Models - Network Evolution based Probabilistic Model - Hierarchical Probabilistic Model:- Probabilistic Relational Models : Relational Bayesian Network - Relational Markov Network

UNIT - V **9**

Visualization: Structural Visualization - Semantic and Temporal Visualization - Statistical Visualization - **Text Mining in Social Networks:** Keyword Search : Query Semantics and Answer Ranking - Keyword search over XML and relational data - Keyword search over graph data - Classification Algorithms - Clustering Algorithms

TOTAL: 45

TEXT BOOKS:

1. Charu C. Aggarwal, "Social Network Data Analytics", Springer, 2011.

REFERENCE BOOKS:

1. Peter Mika, "Social Networks and the Semantic Web", 1st Edition, Springer, 2007.
2. Borko Furht, "Handbook of Social Network Technologies and Applications", 1st Edition, Springer, 2010.
3. Guandong Xu , Yanchun Zhang and Lin Li, "Web Mining and Social Networking – Techniques and Applications", 1st Edition, Springer, 2011.
4. Giles, Mark Smith, John Yen, "Advances in Social Network Mining and Analysis", Springer, 2010.
5. Ajith Abraham, Aboul Ella Hassanien, Václav Snášel, "Computational Social Network Analysis: Trends, Tools and Research Advances", Springer, 2009.

Course Outcomes:

On completion of the course the students will be able to

- work on the internals components of the social network
- model and visualize the social network
- mine the behaviour of the users in the social network
- predict the links from social network
- mine the opinion of the user

14CSE08 UNIX INTERNALS

3 0 0 3

Pre-Requisites: Basics of C Programming and Operating System

UNIT – I **9**

UNIX System Structure: Architecture of Unix Operating System- Introduction to System Concepts- Kernel- Kernel data structures- System Administration - Buffer cache: Buffer headers – Structure of the Buffer pool – Scenarios for retrieval of a buffer – Reading and Writing disk blocks – Advantages and Disadvantages of buffer cache

UNIT – II **9**

Internal Representation of Files and System Calls: Inode- Structure of a regular file- Directories- Conversion of a path name to an Inode – Super block – Inode assignment to a new file – Allocation of disk blocks – Other file types – System Calls : Open- Read- Write- File and Record locking- Lseek- Close- File creation- Creation of special files- Changing directory and root- Changing Owner and mode- STAT & FSTAT – Pipes - DUP - Mounting and unmounting file system- Link- Unlink- File system abstractions - File system maintenance

UNIT – III **9**

The Structure of Processes: Process states and transitions - Layout of System Memory - Context of a process- Saving the context of the process- Manipulation of the process address space – Sleep – Process Control: Process Creation - Signals- Process Termination – Awaiting Process Termination - Invoking other programs- User ID of Process - Changing the size of a process- The Shell - System boot and init process

UNIT – IV **9**

Interprocess Communication and Multiprocessor Systems: Process Scheduling- System calls for time – Clock - Interprocess Communication: Process tracing – System V IPC – Network Communication, Sockets – Multiprocessor Systems: Problems of Multiprocessor Systems – Solution with master and slave processors – Solution with Semaphores

UNIT - V **9**

Memory Management and I/O: Swapping- Demand Paging- Data Structures for Demand Paging – Page Stealer Process – Page Faults – Demand Paging on less Sophisticated Hardware - Hybrid system with Swapping and Demand Paging - I/O Subsystem: Driver Interfaces – Disk Drivers – Terminal Drivers – Streams

TOTAL: 45

TEXT BOOKS:

1. Maurice J. Bach, "The Design of the UNIX Operating Systems", 2nd Edition, PHI/ Pearson Education, New Delhi, Reprint, 2013.

REFERENCE BOOKS:

1. Rosen, Kenneth H., Host, Douglas A., Klee, Rachel, and Rosinski, Richard R., "UNIX: The Complete Reference", 2nd Edition, Tata McGraw Hill, 2007.
2. Uresh Vahalia, "UNIX Internals: The New Frontiers", PHI/ Pearson Education, New Delhi, 2010.

Course Outcomes:

On completion of the course the students will be able to

- analyze the buffers and kernel representation
- recognize the structure of files and directories
- elucidate various system information using unix system structure and system calls
- understand the process of Inter process communication
- recall the memory management policies and I/O operations

14CSE09 MULTICORE ARCHITECTURE

3 0 0 3

Pre-requisites: Computer Architecture, Operating Systems

UNIT – I **9**

Fundamentals Of Quantitative Design And Analysis: Classes of computers – Trends in Technology , power, Energy and Cost – Dependability – Measuring, Reporting and Summarizing Performance – Quantitative Principles of computer Design- Classes of Parallelism – ILP,DLP,TLP and RLP.

UNIT – II **9**

Multi Core Architectures: Multi Threading – SMT and CMP Architectures – Limitations of Single Core Processors – The MultiCore era- Case Studies of Multi Core Architectures.

UNIT – III **9**

DLP in Vector, SIMD and GPU Architectures: Vector Architectures – SIMD Instruction set Extensions for Multimedia – Graphics Processing Units- Detecting and Enhancing Loop Level Parallelism – Case Studies.

UNIT – IV **9**

TLP and Multi Processors: Symmetric and Distributed Shared Memory Architectures – Cache Coherence Issues – Performance Issues – Synchronization Issues – Models of Memory Consistency – Inter Connection Networks – Buses, Crossbar and Multi-stage Interconnection Networks.

UNIT – V **9**

RLP and DLP in Warehouse Scale Architectures: Programming Models and Workloads for Warehouse scale Computers – Architecture for Warehouse scale computing – Physical Infrastructure and costs – cloud computing – Case studies.

TOTAL: 45

TEXT BOOKS:

1. John L. Hennessey and David A. Patterson, “Computer Architecture – A Quantitative Approach”, 5th Edition, Morgan Kaufmann/Elsevier, 2012.

REFERENCE BOOKS:

1. Kai Hwang, “Advanced Computer Architecture”, 2nd Edition, Tata McGraw-Hill Education, 2004.
2. Richard Y. Kain, “Advanced Computer Architecture a Systems Design Approach”, Prentice Hall, 2011.
3. David E. Culler, Jaswinder Pal Singh, “Parallel Computing Architecture: A Hardware/ Software Approach”, Morgan Kaufmann / Elsevier, 1997.

Course Outcomes:

On completion of the course the students will be able to

- identify the limitations of ILP and the need for multi core architectures
- discuss the issues related to multiprocessing and suggest solutions
- elicit the salient features of different multi core architectures and how they exploit parallelism
- analyze the different types of inter connection networks
- discuss the architecture of GPUs, Warehouse-Scale computers and embedded processors

14CSE10 KNOWLEDGE REPRESENTATION AND REASONING

3 0 0 3

Pre-requisites: Knowledge of basic artificial intelligence problems and principles

UNIT – I **9**

Introduction to Knowledge Representation: The key concepts: knowledge, representation and reasoning - Why knowledge representation and reasoning? – The role of logic – The language of first order logic : The syntax – The semantics – The pragmatics - Explicit and Implicit Belief – Knowledge representation: Network representation schemes – Semantic networks, Conceptual Graphs, Conceptual Dependency – Structured representation schemes – Frames, Scripts – Ontologies in intelligent systems – Types of ontologies, usage of ontologies.

UNIT – II **9**

Reasoning and Object Oriented Representation: Reasoning with Horn clauses : Horn clauses – Resolution derivation with Horn clauses SLD resolution – Goal tress- Computing SLD derivations – Backward chaining, Forward chaining, The first order case- Object oriented representation: Objects and frames – A basic frame formalism

UNIT – III **9**

Structured Descriptions and Inheritance: Descriptions – Noun phrases, concepts, roles and constants – A description language – Meaning and entailment – Computing entailments – Taxonomies and classification – Inheritance: Inheritance networks – Strategies for defeasible inheritance – A formal account of inheritance networks

UNIT – IV **9**

Defaults, Vagueness, Uncertainty and Degress of Belief: Defaults: Introduction – Closed world reasoning – Circumscription – Default logic – Auto epistemic logic Non categorical reasoning - Objective probability – Subjective probability – Vagueness.

UNIT – V **9**

Actions, Expressiveness and Tractability: Actions: The calculus – A simple solution to the frame problem – complex actions - The trade of between expressiveness and traceability: A description logic case study – Limited languages – Vivid knowledge.

TOTAL: 45

TEXT BOOKS:

1. Ronald J. Brachman, Hector J. Levesque, "Knowledge Representation and Reasoning", Elsevier, Morgan Kaufmann Publications, Sanfrancisco, 2004.
2. Rajendra Akerkar, "Introduction to Artificial Intelligence", 2nd Edition, PHI Learning Pvt. Ltd., New Delhi, 2014.

REFERENCE BOOKS:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", 3rd Edition, Pearson Education, New Jersey, 2010.
2. Michael Gelfond and Yulia Kahl, "Knowledge Representation, Reasoning and the Design of Intelligent Agents", Cambridge University Press, USA, 2014.
3. Frank Van Harmelen, Vladimir Lifschitz and Bruce Porter, "Handbook of Knowledge Representation", Elsevier Science, 2008.

Course Outcomes:

On completion of the course the students will be able to

- apply fundamental principles of logic and reasoning underlying current systems
- predict which knowledge based techniques are appropriate for which tasks
- analyze knowledge based systems and compare tradeoff between representation and reasoning
- utilize conceptual graphs and ontologies to their research and real world problems
- demonstrate inheritance systems and approaches to handle uncertain or incomplete knowledge

14CSE11 BUSINESS INTELLIGENCE AND ITS APPLICATION

(Common to CSE & IT branches)

3 0 0 3

Pre-requisites: Data Warehousing and Data Mining

UNIT - I **9**

Introduction: Business View of Information Technology Applications: Core Business Processes – Baldrige Business Excellence Framework – Purpose of using IT in Business – Characteristics of Internet-ready IT Applications – Enterprise Applications – Information users and their requirements. Types of Digital Data: Introduction – Getting into GoodLife Database – Structured Data – Unstructured Data – Semi-Structured Data – Difference between semi-structured and structured data.

UNIT – II **9**

Business Intelligence and Data Integration: Business Intelligence: Definition – Evolution – Need for BI – BI Value Chain – Business Analytics – BI Framework – BI Users – BI Applications – BI Roles and Responsibilities – Data Integration : Need for Data Warehouse – Definition of Data Warehouse – Data mart – Ralph Kimball's Approach vs.W.H.Inmon's Approach – Goals of Data Warehouse – ETL Process – Data Integration Technologies – Data Quality – Data Profiling.

UNIT - III **9**

OLTP, OLAP and Multidimensional Data Modeling: OLTP – OLAP – OLAP Architectures – Data Models – Role of OLAP Tools in BI - OLAP Operations - Basics of Data Modeling – Types of Data Model – Data Modeling Techniques – Fact Table – Dimension Table – Dimensional Models - Dimensional Modeling Life Cycle – Designing the Dimensional Model.

UNIT - IV **9**

Performance Management and Enterprise Reporting: Measures, Metrics, KPIs and Performance Management: Understanding Measures and Performance – Measurement System - Role of metrics – KPIs – Enterprise Reporting: Reporting Perspectives - Report Standardization and Presentation Practices– Enterprise Reporting Characteristics - Balanced Scorecard - Dashboards - Creating Dashboards - Scorecards vs. Dashboards - Analysis.

UNIT – V **9**

BI Applications: Understanding Business Intelligence and Mobility – Business Intelligence and Cloud Computing – Business Intelligence for ERP systems – Social CRM and Business Intelligence - Case Study: GoodLife HealthCare Group, GoodFood Restaurants Inc, TenToTen Retail Stores.

TOTAL: 45

TEXT BOOKS:

1. Prasad R.N. and Seema Acharya, "Fundamentals of Business Analytics", 2011 Edition, Wiley-India Publication, Reprint 2012.
2. Ramesh Sharda, Dursun Delen and Efraim Turban, "Business Intelligence: A Managerial Perspective on Analytics", 3rd Edition, Pearson Education, 2013.

REFERENCE BOOKS:

1. David Loshin, "Business Intelligence: The Savvy Manager's Guide", 2nd Edition, Morgan Kaufmann Publishers, 2012.
2. Mike Biere, "Business Intelligence for the Enterprise", 1st Edition, IBM Press, 2003.
3. Larissa Terpeluk Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle for Decision-support Applications", Addison-Wesley Professional, 2003.

Course Outcomes:

On completion of the course the students will be able to

- discuss about enterprise view of IT applications and different types of data
- express about concepts and technology in BI space
- compare OLTP with OLAP systems
- analyze data from multiple perspectives and presenting the data to information users
- apply BI to Mobile, Cloud, ERP and Social CRM systems

14CSE12 ADHOC AND WIRELESS SENSOR NETWORKS

3 0 0 3

Pre-requisites: Computer Networks

UNIT – I **9**

Introduction To Wireless Network: Characteristics of wireless channel - Fundamentals of WLANs - IEEE 802.11 Standard - HIPERLAN Standard–Bluetooth-Cellular Concept and Architecture – WLL - Wireless ATM - IEEE 802.16 Standard - Ad hoc Wireless Network.

UNIT – II **9**

MAC Protocols: Design issues - Goals and Classification - Contention based Protocols –MACAW, FAMA –Contention based reservation scheme-D-PRMA, RTMAC -Contention based with scheduling mechanisms-DPS, DLPS

UNIT – III **9**

Routing Protocols: Design issues and Classification - Table-driven(DSDV,CGSR), On-demand(AODV,DSR)-Hybrid routing protocols(ZRP) - Routing protocols with efficient flooding mechanisms(PLBRP) – Hierarchical(HSRP) and power-aware routing protocols(PARM). Multicast routing protocols design issues and operation - Architecture reference model – Classification.

UNIT – IV **9**

Wireless Sensor Networks: Overview of Wireless Sensor Networks-Architecture-Constraints and Challenges-Advantages and Applications - Data Dissemination and Gathering-MAC – Localization and Tracking

UNIT - V **9**

WSN Routing and QoS: Geographic Routing- Attribute Routing – Infrastructure Establishment-Sensor Tasking and Control - Quality of Sensor Network-Evolving Standards-Other Issues.

TOTAL: 45

TEXT BOOKS:

1. Siva Ram Murthy C. and Manoj B.S., "AdHoc Wireless Networks: Architectures and Protocols", Illustrated Edition, Prentice Hall PTR, 2007.
2. Feng Zhao and Leonidas Guibas, "Wireless Sensor Networks - An Information Processing Approach", Morgan Kaufman Publishers, 2004.

REFERENCE BOOKS:

1. Toh C.K., "AdHoc Mobile Wireless Networks: Protocols and Systems", 1st Edition, Prentice Hall PTR, 2001.
2. Mohammad Ilyas, "The Handbook of AdHoc Wireless Networks", CRC Press, 2002.
3. Ramin Hekmat, "Ad-hoc Networks: Fundamental Properties and Network Topologies", 1st Edition, Springer, 2006.

Course Outcomes:

On completion of the course the students will be able to

- express the basic wireless network concepts
- explain the challenges in designing MAC protocols for adhoc networks
- relate the MAC and routing protocols of ad hoc networks
- identify various constraints, challenges and QoS parameters in wireless sensor networks
- outline the application of WSN and usage of higher layers of ad hoc networks

14EIE04 SOFT COMPUTING TECHNIQUES

(Common to EIE, ECE & CSE branches)

3 0 0 3

UNIT – I **9**

Introduction: Biological neural network - Artificial Neural Network (ANN): Basic models of ANN, Important terminologies of ANN - McCulloch-Pitts neuron - Linear separability - Hebb network- Perceptron networks - Back Propagation Network (BPN).

UNIT – II **9**

Learning Networks: Adaptive linear neuron - Radial Basis Function Network (RBFN), Associative memory networks: Discrete Hop field network. Fixed weight competitive nets, Kohonen Self Organising Feature Maps (KSOM).

UNIT – III **9**

Basic Concepts of Fuzzy Logic: Introduction to fuzzy logic, Classical sets and Fuzzy sets, Fuzzy relations, Membership function: Features of membership function, Fuzzification, Methods of membership value assignments - Fuzzy rules and reasoning: Fuzzy if-then rules. Fuzzy Inference Systems (FIS): Introduction – Methods of FIS: Mamdani, Sugeno and Tsukamoto. Defuzzification: Lambda-Cuts for fuzzy sets and fuzzy relations, Defuzzification methods.

UNIT – IV **9**

Genetic Algorithm: Introduction to Genetic Algorithms (GA) – Biological background – Operators: Encoding, Selection, Cross over, Mutation. Problem solving using Genetic Algorithm: Maximizing a function.

UNIT – V **9**

Neuro-Fuzzy Hybrid System: Classification of neuro fuzzy hybrid systems, Adaptive Neuro Fuzzy Inference System (ANFIS) - Simplified fuzzy ARTMAP. Applications: Printed character recognition, Fuzzy based controller applications.

TOTAL: 45

TEXT BOOKS:

1. S.N.Sivanandam, S.N.Deepa, "Principles of Soft Computing", 2nd Edition, Wiley, 2014.
2. S.Rajasekaran, G.A.Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms – Synthesis and Applications", PHI, 2003.
3. J.S.R.Jang, C.T.Sun, E.Mizutani, "Neuro – Fuzzy and Soft Computing", PHI Learning Pvt. Ltd., 2012.

REFERENCE BOOKS:

1. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", 3rd Edition, Wiley, 2010.
2. Samir Roy, Udit Chakraborty, "Introduction to Soft Computing – Neuro Fuzzy and Genetic Algorithms", Pearson, 2013.

Course Outcomes:

On completion of the course the students will be able to

- understand the concepts of neural network
- develop a rule based fuzzy systems
- apply neural network and fuzzy logic control to real time systems
- effectively incorporate genetic algorithm in problem solving
- develop a hybrid neuro – fuzzy model

14ITE10 CYBER FORENSICS

(Common to IT & CSE branches)

3 0 0 3

Pre-requisites: Cryptography and Network Security

UNIT – I **9**

Computer Forensics and Investigation as a Profession: Preparing for computer investigations- Maintaining professional conduct Understanding Computer Investigations: Preparing a computer investigation-Taking a symmetric approach- Procedures for corporate High- Tech investigations Understanding data recovery workstation and software-Conducting an investigation The investigator's Office and Laboratory: Acquiring certification and training- Determining the physical requirements for a computer forensics lab-Selecting a basic forensic workstation-Building a business case for developing a forensic lab

UNIT – II **9**

Data Acquisition: Understanding storage format for digital evidence-Determining the best acquisition method-Contingency planning for image acquisitions-Validating data acquisitions – Performing RAID data acquisitions- Using remote network acquisition tools. Processing crime and Incident Scenes: Identifying digital evidence- Processing law enforcement crime scenes- Preparing for a search- Securing a computer incident-Seizing digital evidence at the scene- Storing digital evidence-Obtaining a digital hash

UNIT – III **9**

Current Computer Forensic Tools: Evaluating computer forensic tools: Types of computer forensic tools-Task performed by computer forensic tools-Computer forensic software tools-Computer forensic hardware tools-Validating and testing forensic software. Computer Forensics Analysis and Validation: Determining what data to collect and analyze-Validating forensic data-Addressing data hiding techniques

UNIT – IV **9**

Recovering Graphics File: Recognizing a graphics file- understanding data compression-Understanding copyright issues with graphics. Virtual Machines, Network Forensics and Live Acquisitions: Virtual machines overview- Network forensics overview- Using network tools

UNIT – V **9**

E-Mail Investigations: Exploring the role of email in investigations – Exploring the role of client and server in email- Investigating email crimes and violations- Understanding email servers. Cell phone and Mobile Device Forensics: Understanding mobile device forensics- Understanding Acquisition procedures for cell phones and mobile devices

TOTAL: 45

TEXT BOOKS:

1. Bill Nelson, Amelia Philips and Christopher Steuart, "Guide to Computer Forensics and Investigations", 4th Edition, Cengage Learning, New Delhi, 2010.

REFERENCE BOOKS:

1. Jason T. Luttgens, Matthew Pepe, Kevin Mandia, "Incident Response and computer Forensics", 3rd Edition, Tata McGraw-Hill, New Delhi, 2004.
2. Robert M. Slade, "Software Forensics", 1st Edition, Tata McGraw-Hill, New Delhi, 2005.
3. Bernadette H. Schell and Clemens Martin, "Cybercrime", 1st Edition, ABC-CLIO Ltd., 2004.
4. NIIT(Corporation), "Understanding Forensic in IT", 1st Edition, Prentice-Hall of India Pvt. Ltd., 2005.

Course Outcomes:

On completion of the course the students will be able to

- understand the basics of computer forensics
- acquire knowledge in digital evidence collection
- use the various free open source forensics tools
- apply forensics tools in network environment
- identify the cybercrimes in e-mail and mobile devices

14ITE12 BUILDING ENTERPRISE APPLICATIONS

(Common to IT & CSE branches)

3 0 0 3

UNIT – I **9**

Analysis and Modeling: Introduction to enterprise applications and their types - Software engineering methodologies - Life cycle of raising an enterprise application - Introduction to skills required to build an enterprise application - Key determinants of successful enterprise applications - Measuring the success of enterprise applications. Inception of enterprise applications - Enterprise analysis, business modeling, requirements elicitation, use case modeling, prototyping, Non functional requirements, requirements validation, planning and estimation.

UNIT – II **9**

Architecting and Designing: Concept of architecture - Views and viewpoints - Enterprise architecture - Logical architecture - Technical architecture and Design, Different technical layers, Object –Oriented Analysis and Design - Best practices - Data architecture and design – relational, XML, and other structured data representations.

UNIT – III **9**

Architectural Design: Technical architecture - Infrastructure architecture and design elements - Networking, Internetworking, and Communication Protocols, IT Hardware and Software, Middleware, Policies for Infrastructure Management, Deployment Strategy, Documentation of application architecture and design.

UNIT – IV **9**

Construction: Construction readiness of enterprise applications - defining a construction plan, defining a package structure, setting up a configuration management plan, setting up a development environment, introduction to the concept of Software Construction Maps, construction of technical solutions layers, methodologies of code review, static code analysis, build and testing. Dynamic code analysis – code profiling and code coverage.

UNIT – V **9**

Testing and Rolling out Enterprise Applications: Testing an enterprise application - Testing levels and approaches - Testing environments, integration testing, performance testing, penetration testing, usability testing, globalization testing and interface testing, user acceptance testing, rolling out an enterprise application.

TOTAL : 45

TEXT BOOKS:

1. Anubhav Pradhan, Satheesha B. Nanjappa, Senthil K. Nallasamy, Veerakumar Esakimuthu, "Raising Enterprise Applications", 1st Edition, Wiley India Pvt. Ltd., 2010.
2. Brett McLaughlin, "Building Java Enterprise Applications", 1st Edition, O"Reilly Media Publications, 2002.

REFERENCE BOOKS:

1. Soren Lauesen, "Software Requirements: Styles & Techniques", 1st Edition, Addison-Wesley Professional Publications, 2002.
2. Brian Berenbach, Daniel J. Paulish, Juergen Kazmeier, Arnold Rudorfer, "Software Systems Requirements Engineering: In Practice", 1st Edition, McGraw - Hill/Osborne Media Publications, 2009.
3. Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing Principles and Practices ", 1st Edition, Pearson Publications, 2006.

Course Outcomes:

On completion of the course the students will be able to

- apply the concepts of Enterprise Analysis and Business Modeling
- design and document the application architecture
- understand the importance of application framework and designing other application components
- perform Code review, Code analysis and Build process
- understand different testing involved with enterprise application and the process of rolling out an enterprise application

14GEE81 ENTREPRENEURSHIP DEVELOPMENT

(Common to all Engineering and Technology branches except Civil and Chemical Engg.)

3 0 0 3

UNIT – I **9**

Entrepreneurship Concepts: Meaning and concept of entrepreneurship, Role of Entrepreneurship in Economic Development. Factors affecting Entrepreneurship – Creativity, Innovation and Entrepreneurship, Intrapreneurship

UNIT – II **9**

Entrepreneur: Definition, Entrepreneurial Motivation, Characteristics of Entrepreneurs, Distinction between an Entrepreneur and a Manager.

UNIT – III **9**

Business Plan: Objectives of a Business Plan, Business Planning Process, Opportunity Identification and Selection, Contents of a Business Plan, Functional Plans.

UNIT – IV **9**

Entrepreneurial Eco System: Forms of Business Ownership, Sources of Finance, Institutional Support to Entrepreneurs.

UNIT – V **9**

Small Business Management: Definition of Small Scale Industries, Strengths and Weaknesses of Small Business, Growth Strategies in Small Scale Enterprises, Sickness in Small Enterprises – Symptoms, Causes and Consequences.

TOTAL : 45

TEXT BOOK:

1. S.S.Khanka, "Entrepreneurial Development", 4th Edition, S.Chand & Company Ltd., 2012.
2. Madhurima Lall and Shikha Sahai, "Entrepreneurship", 2nd Edition, Excel Books, New Delhi, 2008.

REFERENCE BOOKS:

1. Raj Shankar, "Entrepreneurship, Theory and Practice", Vijay Nicole Imprints Pvt. Ltd., Chennai 2012.
2. Barringer and Ireland, "Entrepreneurship", 3rd Edition, Pearson Education, 2012.
3. Zimmer and Scarborough, "Essentials of Entrepreneurship and Small Business Management", 5th Edition, PHI Learning Pvt. Ltd., 2009.

Course Outcomes:

On completion of the course the students will be able to

- understand the concepts of entrepreneurship and its importance
- understand the traits of an entrepreneur and the sources of his motivation
- understand the components of a business plan
- demonstrate knowledge of various sources of finance and institutions supporting entrepreneurship
- understand the nature of small business and causes of industrial sickness

14CSE13 DIGITAL DESIGN VERIFICATION

3 0 0 3

Pre-requisites: Digital Design and Verilog Progamming, Compiler Simulation and Modeling, Theory of Computation

UNIT – I **9**

Introduction: Basic Verification Principle-Verification Methodology - Simulation Based Verification vs. Formal Verification - Limitations of Formal Verification - Overview of Verilog Scheduling and Execution Semantics. **Coding for Verification:** Functional Correctness - Timing Correctness - Simulation Performance - Cycle-based Simulation - Hardware Simulation/Emulation - Two-state and Four-state Simulation

UNIT – II **9**

Simulator Architectures and Operations: The Compilers - The Simulators : Event Driven Simulators, Cycle Based Simulators, Hybrid Simulators, Hardware Simulators and Emulators - Simulator Taxonomy and Comparison - Simulator operations and Applications - Incremental Compilation - Simulator Console

UNIT – III **9**

Testbench Organization and Design: Anatomy of Testbench and Test Environment - Initialization Mechanism - Clock Generation and Synchronization - Stimulus Generation - Response Assessment - Verification Utility - Testbench to Design Interface. **Test Scenario, Assertion, and Coverage:** Hierarchical Verification - Test Plan – Assertions - Verification Coverage

UNIT – IV **9**

Debugging Process and Verification Cycle: Failure Capture, Scope Reduction, and Bug Tracking - Simulation Data Dumping - Isolate Underlying Causes - Design Update and Maintenance: Revision Control - Regression, Release Mechanism, and Tape-out Criteria. **Formal Verification Preliminaries:** Sets and Operations -Relation, Partition, Partially Ordered Set, and Lattice - Boolean Functions and Representations - Boolean Functional Operators - Finite State Automata and Languages

UNIT - V **9**

Decision Diagrams, Equivalence Checking and Symbolic Simulation: Binary Decision Diagrams - Variable Ordering - Decision Diagram Variants - Decision Diagram Based Equivalence Checking - Boolean Satisfiability - Symbolic Simulation. **Model Checking and Symbolic Computation:** Properties, Specifications, and Logic - Property Checking - Symbolic computation and model checking - Symbolic CTL model checking

TOTAL: 45

TEXT BOOKS:

1. William K. Lam., "Hardware Design Verification: Simulation and Formal Method-Based Approaches", 1st Edition, Prentice Hall, 2005.

REFERENCE BOOKS:

1. Samir Palnitkar, "Design Verification with 'e' ", 1st Edition, Prentice Hall Professional, 2004.
2. Janick Bergeron, "Writing Test benches: Functional Verification of HDL Models", 2nd Edition, Springer, 2003.
3. Michael Huth and Mark Ryan, "Logic in Computer Science Modeling and Reasoning About Systems", 2nd Edition, Cambridge University Press, 2004.

Course Outcomes:

On completion of the course the students will be able to

- describe the role of verification in digital hardware development
- develop various test cases for simulation
- evaluate the role of verification procedure adapted by different checking methodologies
- distinguish between the Simulation-based versus formal verification models and their advantages, disadvantages, and tradeoffs coding for verification
- carry out tasks and assignments effectively as instructed with the use of modern technology through research and case studies

14CSE14 BIG DATA ANALYTICS

(Common to CSE & IT branches)

3 0 0 3

UNIT – I **9**

Introduction: Big data Introduction - Types of Data – characteristics – evolution – definition – challenges – characteristics – Big Data Analytics – importance – data science – terminologies used in Big data environments

UNIT – II **9**

Hadoop: Hadoop Introduction – RDBMS Vs Hadoop – distributed computing challenges – HDFS – Processing data with Hadoop – Interacting with Hadoop Ecosystem – Introduction to MapReduce Programming- mapper-reducer-combiner-partitioner-searching-sorting-compression.

UNIT – III **9**

MongoDB and Cassandra: Introduction to MongoDB – data types in MongoDB – MongoDB Query Language – Introduction to Cassandra – Features of Cassandra – CQL Data types – CRUD operations – collections – alter – import and export – Querying System tables .

UNIT – IV **9**

HIVE and PIG: Introduction to Hive – Architecture – Data types – file format – Hive Query Language – Introduction to Pig – Pig on Hadoop – Data types – running Pig – Execution modes of Pig – HDFS commands – Relational Operators – Eval function – Complex Data types.

UNIT - V **9**

Apache Spark: Introduction to Data Analytics with Spark – Getting started with Spark – Introduction to Spark's Python and Scala shells – Spark RDD – Spark Core Programming – Spark Deployment.

TOTAL: 45

TEXT BOOKS:

1. Seema Acharya and Subhashini Chellappan, "Big Data and Analytics", 1st Edition, Wiley, 2015.

REFERENCE BOOKS:

1. "Data science and Big data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", EMC Education Services, John Wiley and Sons, 2015.
2. Frank J. Ohlhorst, "Big Data Analytics: Turning Big Data into Big Money", Wiley and SAS Business Series, 2012.
3. Holden Kararu, Andy Konwinski, Padtrick Wendell, Matei Zaharia, "Learning Spark", O'Reilly Books, 2015.

COURSE OUTCOMES:

On completion of the course the students will be able to

- describe the concepts and characteristics of Big Data
- recognize the usage of Hadoop
- determine the use Hadoop database system
- describe the architecture and formats of Hive and Pig
- apply spark to solve large data analysis problems

14CSE15 SEMANTIC WEB

(Common to CSE & IT branches)

3 0 0 3

Pre-requisites: Web Technology

UNIT – I **9**

Introduction to Semantic Web: Introduction – Semantic Web Technologies – Layered approach – Describing Web Resources: RDF: Data Model – Syntaxes – RDFS: Adding Semantics – RDF Schema: Language – RDF and RDF Schema in RDF Schema – Axiomatic Semantics for RDF and RDF Schema – Direct Inference System for RDF and RDFS.

UNIT – II **9**

Querying the Semantic Web: SPARQL Infrastructure – Basics: Matching Patterns – Filters – Constructs for Dealing with an Open World – Organizing Result Sets – Other Forms of SPARQL Queries – Querying Schemas – Adding Information with SPARQL Update.

UNIT – III **9**

Web Ontology Language OWL2: Introduction – Requirements for Ontology Languages – Compatibility of OWL2 with RDF/RDFS – OWL Language – OWL2 Profiles.

UNIT – IV **9**

Logic and Inference: Rules: Introduction – Example of Monotonic Rules: Family Relationships – Monotonic Rules: Syntax – Monotonic Rules: Semantics – OWL2RL: Description Logic meets Rules – Rule Interchange Format: RIF – Semantic Web Rules Language(SWRL) – Rules in SPARQL:SPIN – Nonmonotonic Rules: Motivation and Syntax – Example of Nonmonotonic Rules: Brokered Trade – Rule Markup Language(RuleML).

UNIT – V **9**

Applications & Ontology Engineering: Good Relations – BBC Artists – BBC World Cup 2010 Website – Government Data – New York Times – Sigma and Sindice – OpenCalais – Schema.org. Constructing Ontologies Manually – Reusing Existing Ontologies – Semiautomatic Ontology Acquisition – Ontology Mapping – Exposing Relational Databases – Semantic Web Application Architecture.

TOTAL: 45

TEXT BOOKS:

1. Grigorous Antoniou, Paul Groth, Frank van Harmelen and Rinke Hoekstra, "A Semantic Web Primer", 3rd Edition, The MIT Press, 2012.

REFERENCE BOOKS:

1. Dieter Fensel, James A. Hendler, Henry Lieberman and Wolfgang Wahlster, "Spinning the Semantic Web: Bringing the world wide web to its full potential", 1st Edition, The MIT Press, 2005.
2. Shelley Powers, "Practical RDF", 1st Edition, O'Reilly Publishers, First Indian Reprint, 2003.

Course Outcomes:

On completion of the course the students will be able to

- model ontologies using Resource Description Framework (RDF)
- query ontologies using SPARQL
- model and design ontologies using Web Ontology Language (OWL)
- apply semantic web technologies to real world applications
- illustrate the principles of Ontology Engineering

14CSE16 SOFTWARE PROJECT MANAGEMENT

(Common to CSE & IT branches)

3 0 0 3

Pre-requisites: Software Engineering

UNIT – I **9**

Introduction to Software Project Management: Introduction to Software Project Management - Importance – types of project – Activities – plans, methods and methodologies – Ways of Categorizing software projects – Stakeholders – Setting objectives – Management and management control – Traditional vs Modern project management practices. **Project Evaluation:** Introduction – A business case – Project Portfolio Management – Evaluation of Individual Projects – Cost Benefit Evaluation Techniques – Risk Evaluation

UNIT – II **9**

Project Planning: Introduction to step wise project planning – Select project - Identify project scope and objectives, project infrastructure – Analyse project characteristics – identify project products and activities – estimate effort for activity – identify activity risks, Allocate Resources – Review plan – Execute plan. **Software Effort Estimation :** Introduction – Estimates – problems – Basis –Techiques – Bottom-up Estimating – Top down approach and parametric models – COSMIC – COCOMO II

UNIT – III **9**

Activity Planning and Risk Management: Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature of Risk – Types of Risk – Framework – Risk Identification – Risk Assessment – Risk Planning – Risk management – Applying PERT Technique – Monte Carlo Simulation

UNIT – IV **9**

Monitoring and Control: Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types of Contract – Stages In Contract Placement – Typical Terms of A Contract – Contract Management – Acceptance

UNIT – V **9**

Managing People and Organizing Teams: Introduction – Understanding Behavior – Organizational Behaviour: A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldham – Hackman Job Characteristics Model – Stress –Health And Safety –Working In Groups – Becoming A Team –Decision Making– Organizational Structures – Case Studies.

TOTAL: 45

TEXT BOOKS:

1. Bob Hughes, Mike Cotterell and Rajib Mall, "Software Project Management", 5th Edition, Tata McGraw Hill, New Delhi, 2011.

REFERENCE BOOKS:

1. Pankaj Jalote, "Software Project Management in Practice", 8th Impression, Pearson, 2002.
2. Watts S. Humphrey, "PSP: A self-improvement process for software engineers", 1st Print, Addison-Wesley, 2005.
3. Watts S. Humphrey, "Introduction to the Team Software Process", 5th Print, Addison-Wesley, 2000.
4 Orit Hazzan and Yael Dubinsky, "Agile Software Engineering", Springer, 2008.
5 James R. Persse, "Process Improvement Essentials", 1st Edition, O'Reilly, 2006.

Course Outcomes:

On completion of the course the students will be able to

- understand and practice the process of project management
- evaluate and assess the projects
- produce an activity plan of the project and analyzing the risks involved in it
- identify the resources required for a project and to produce a work plan and resource schedule
- monitor the progress of projects and to control the risks involved
- identify the factors that influence people's behavior in a project environment and to improve group working

14CSE17 SOFTWARE QUALITY ASSURANCE

(Common to CSE & IT branches)

3 0 0 3

Pre-requisites: Software Engineering

UNIT – I **9**

Software Quality in Business Context: Defining Quality – Need for Quality – Quality Control Vs Quality assurance – Quality assurance at each phase of SDLC. Managing software Quality in an Organization: QMS – Need for SQA group in an Organization. Planning for SQA : Software Quality assurance plans – Organizational level initiatives.

UNIT – II **9**

Product Quality and Process Quality: Introduction – Software systems evolution – Product quality – Models for software product Quality – Process Quality. Software Measurement and Metrics : Introduction – Measurement during software life cycle context – Defect metrics – Metrics for software maintenance – Classification of software metrics – Requirements related metrics – Measurements and process improvement – Measurement principles

UNIT – III **9**

Walkthroughs and Inspections: Introduction – Structured walkthroughs – Inspections – Various roles and responsibilities involved in Reviews / Inspections – Some psychological aspects of reviews. Software Configuration Management : Need for SCM – Software configuration management activities – Personnel in SCM activities

UNIT – IV **9**

Software Quality Assurance Standardization: ISO 9000 – Origin of ISO 9000 – Work of ISO – ISO standards development process. ISO 9001 : 2000 – ISO Certification – Assessment / Audit preparation – Assessment process – ISO consulting services and consultants. Software CMM and other Process Improvement Models : The Capability Maturity Model for software – An overview – Practices followed at mature organizations – Types of CMMs Model

UNIT – V **9**

Software Testing: Purpose of testing – Differences between inspection and testing – Testing Vs debugging – Testing life cycle – Roles and responsibilities in testing – Test artifacts – The test plan – The V- Model for testing phases – Testing techniques – Test metrics – Risk-based testing – Human issues and challenges in testing.

TOTAL: 45

TEXT BOOKS:

1. Nina S. Godbole, "Software Quality Assurance Principles and Practice", Narosa Publishing House, Reprint 2011.

REFERENCE BOOKS:

1. Gordon G Schulmeyer, "Handbook of Software Quality Assurance", 3rd Edition, Artech House Publishers, 2007.
2. Mordechai Ben-Menachem, Garry S. Marliss, "Software Quality", 2nd Edition, Vikas Publishing House Pvt. Ltd., New Delhi, 2014.
3. Gopalswamy Ramesh and Srinivasan Desikan, "Software Testing: Principles and Practices", 6th Impression, Pearson Education, New Delhi, 2006.
4. Watts S. Humphrey, " Managing the Software Process", 5th Impression, Pearson Education Inc., 2008.

Course Outcomes:

On completion of the course the students will be able to

- understand the concepts, metrics, and models in software quality assurance
- identify a framework for software quality assurance and discusses individual components in the framework
- identify the components of software quality assurance systems
- evaluate the methodologies for SCM and understand how to apply it in practice
- choose the software testing techniques to cater to the need of the project

14CSE18 DECISION SUPPORT SYSTEMS

3 0 0 3

Pre-requisites: Database and Software Engineering Concepts

UNIT – I **9**

Decision Making, Modeling and Support: Introduction – Models – Phases of Decision Making Process: The Intelligence Phase, The Design Phase, The Choice Phase, and The Implementation Phase – Support – Case Study: Decision and Risk Management.

UNIT – II **9**

Concepts, Methodologies and Technologies: DSS Configuration – Description – Characteristics and Capabilities – Classification – Components –The Data Management Subsystem – The Model Management Subsystem – The Model Management Subsystem – The User Interface (Dialog) Subsystem – The Knowledge-Based Management Subsystem.

UNIT – III **9**

Modeling and Analysis: MSS Modeling – Static and Dynamic models – Certainty, Uncertainty, and Risk – Structure of Mathematical Models for DSS – MSS Modeling with Spreadsheets – Structure of Mathematical Models for Decision Support – Decision Analysis with Decision Tables and Decision Trees.

UNIT – IV **9**

Data Mining and Data Warehousing: Data Mining Concepts and Applications – Process – Methods – Text mining and Web mining – Data Warehousing: Concepts, Architecture – Data Integration and Extraction, Transformation and Load Processes.

UNIT – V **9**

Management Support Systems: Emerging Trends and Impacts – RFID - Reality Mining - Virtual Worlds - Social Networking -Cloud Computing and BI.

TOTAL: 45

TEXT BOOKS:

1. Efraim Turban and Jay E. Aronson, "Decision Support System and Intelligent Systems", 9th Edition, Prentice Hall International, 2010.

REFERENCE BOOKS:

1. George M. Marakas, "Decision Support Systems In the 21st Century", 2nd Edition, Prentice Hall, 1998.
2. Efrem Mallach, "Decision Support System and Data Warehouse Systems", 1st Edition, McGraw-Hill, 2000.
3. Janakiraman V.S. and Sarukesi K., "Decision Support Systems", 1st Edition, Prentice Hall of India, 2008.

Course Outcomes:

On completion of the course the students will be able to

- explore the different phases, Methodologies and Technologies to develop decision support systems
- gain knowledge of designing DSS/IS for specific problems
- use different data mining techniques
- demonstrate the relation between DSS and other information systems
- understanding the need for computerized support of managerial decision making

14CSE19 FOUNDATIONS OF MODERN NETWORKING

3 0 0 3

Pre-requisites: Computer Networks

UNIT – I **9**

Introduction to Modern Networking: The Networking Ecosystem- Example Network Architectures-- A Global Network Architecture – Ethernet - Wi-Fi - 4G/5G Cellular - Cloud Computing - Internet of Things - Network Convergence - Unified Communications - Requirements and Technology - Types of Network and Internet Traffic - Demand: Big Data, Cloud Computing, and Mobile Traffic - Requirements: QoS and QoE – Routing - Congestion Control - SDN and NFV - Modern Networking Elements.

UNIT – II **9**

Software Defined Networks: Background and Motivation - The SDN Approach - SDN- and NFV-Related Standards - SDN Data Plane and Open Flow - Logical Network Device - SDN Control Plane Architecture - ITU-T Model - OpenDaylight -REST - Cooperation and Coordination Among Controllers - SDN Application Plane Architecture - Network Services Abstraction Layer - Traffic Engineering - Measurement and Monitoring – Security - Data Center Networking - Mobility and Wireless - Information-Centric Networking .

UNIT- III **9**

Virtualization: Network Functions Virtualization: Concepts and Architecture - Motivation for NFV - Virtual Machines - NFV Concepts - NFV Benefits and Requirements - NFV Reference Architecture - NFV Functionality - NFV Infrastructure - Virtualized Network Functions - NFV Management and Orchestration - NFV Use Cases - SDN and NFV - Network Virtualization - Virtual LANs - OpenFlow VLAN Support - Virtual Private Networks - Network Virtualization - OpenDaylight's Virtual Tenant Network - Software-Defined Infrastructure.

UNIT IV **9**

Defining and Supporting User Needs: Quality of Service - QoS Architectural Framework - Integrated Services Architecture - Differentiated Services - Service Level Agreements - IP Performance Metrics - QoE: User Quality of Experience - Service Failures Due to Inadequate QoE Considerations - QoE-Related Standardization Projects - QoE Strategies in Practice - Factors Influencing QoE - Measurements of QoE - Network Design Implications of QoS and QoE - Classification of QoE/QoS - IP-Oriented Parameter-Based QoS/QoE Mapping Models - QoE Versus QoS Service Monitoring - QoE-Based Network and Service Management.

UNIT V **9**

Cloud and IoT: Cloud Computing - Cloud Services - Cloud Deployment Models - Cloud Architecture - SDN and NFV - The Internet of Things: Components - The Scope of the Internet of Things - Components of IoT-Enabled Things - IoT Architecture - IoT Implementation.

TEXT BOOKS: **TOTAL: 45**

1. William Stallings, "Foundations of Modern Networking: SDN, NFV, QoE, IoT and Cloud", 1st Edition, Pearson Education, 2015.

REFERENCE BOOKS:

1. Paul Goransson and Chuck Black, "Software Defined Network – A Comprehensive Approach", 1st Edition, Morgan Kaufmann Publishers, 2014.
2 Thomas D. Nadeau and Ken Gray, "SDN: Software Defined Networks", 1st Edition, O'Reilly Publications, 2014.

Course Outcomes:

On completion of the course the students will be able to

- outline the concepts and elements of Software Defined Networking
- illustrate architecture of data plane and control plane
- summarize the concepts and principles of Network virtualization technologies
- compile QoE parameters and IoT components and its architecture
- understand the cloud architecture and its components

14CSO01 INFORMATION SECURITY

3 0 0 3

UNIT - I **9**

Introduction: Security – Attacks – Computer Criminals – Methods of defense – Elementary Cryptography:- Terminology and Background – Substitution Ciphers – Transpositions – Data Encryption Standard – AES Encryption algorithm – Public Key encryption – Uses of Encryption

UNIT – II **9**

Program Security: Secure Programs - Non malicious Program Errors - Viruses and Other Malicious Code - Targeted Malicious Code - Controls Against Program Threats - Protection in General-Purpose Operating Systems: Protected Objects and Methods of Protection - Memory and Address Protection - Protection Mechanisms

UNIT - III **9**

Trusted Operating Systems and Database Security: Trusted System - Security Policies - Models of Security - Trusted Operating System Design - Assurance in Trusted Operating Systems - Database and Data Mining Security: Introduction to Databases - Security Requirements - Reliability and Integrity - Sensitive Data - Inference - Multilevel Databases

UNIT - IV **9**

Security in Networks and Administering Security: Network Concepts - Threats in Networks - Network Security Controls – Firewalls - Intrusion Detection Systems - Secure E-Mail - Administering Security: Security Planning - Risk Analysis - Organizational Security Policies - Physical Security

UNIT - V **9**

Privacy in Computing: Privacy Concepts - Privacy Principles and Policies - Authentication and Privacy - Data Mining - Privacy on the Web - E-Mail Security - Impacts on Emerging Technologies

TOTAL: 45

TEXT BOOKS:

1 Charles P. Pfleeger and Shari Lawrence Pfleeger, "Security in Computing", 4th Edition, Prentice Hall, 2006.

REFERENCE BOOKS:

1 Michael E. Whitman and Herbert J. Mattord, "Principles of Information Security", 5th Edition, Cengage Learning, India, 2014.

2 Micki Krause, Harold F. Tipton, "Handbook of Information Security Management", Vol. 6, 6th Edition, CRC Press, 2012.

3 Matt Bishop, " Computer Security Art and Science", 5th Print, Addison Wesley, 2003.

Course Outcomes:

On completion of the course the students will be able to

- state the basic concepts in information security and explain the concepts in cryptography
- explain common vulnerabilities in computer programs
- describe the requirements for trusted operating systems and database security
- identify techniques for ensuring network security
- enforcing the privacy principles and policies

14CSO02 COMPUTER MODELING AND SIMULATION

3 0 0 3

Pre-requisites: Basic knowledge of numerical mathematics, probability and statistics, and basics of programming.

UNIT – I **9**

Introduction to Simulation and Random Number Generation: Need for Simulation, Types of Model, Major Steps of Simulation Model, Types of Simulation, Advantages of Simulation, Discrete Event Simulation. Methods of Random Number Generation and their tests-Introduction, Methods of Random Number Generation, Testing Randomness of Random Numbers.

UNIT – II **9**

Probability Distributions and Simulation Languages: Introduction, Probability distribution, Uniform Distribution, Exponential Distribution, Poisson Distribution, Normal Distribution, Gamma Distribution, Erlang Distribution. Introduction to Simulation Languages-Discrete Event Simulation Language Requirements, Evolution of Simulation Languages.

UNIT – III **9**

Queuing Theory and Simulation using High Level Languages: Introduction, Terminologies of Queuing System, Empirical Queuing Models. Single-server Queuing System with single Queue, Parallel-server Queuing System with single Queue, Single-server Queuing System with two Queues and with alternate service, Single-server Queuing System with Balking and reneging, Single-server Model with Single Queue and with Bulk arrivals.

UNIT – IV **9**

General Purpose Simulation System: Introduction, GPSS Blocks Preliminaries, Transfer Block, Print Block, Random Transfer of Transactions ,Conditional Transfer of Transactions to one of two blocks, Sampling Probability Distribution.

UNIT – V **9**

Simulation Languages: Simula Language-Introduction, Basics of Simula, Control statements, File operations, Terminologies of OOPs concepts and class ,Arrays ,Parallel–server, Queueing System. ProModel Simulation Software-Introduction, Modelling Elements, other features of ProModel.

TOTAL: 45

TEXT BOOKS:

1. Panneerselvam R. and Senthilkumar P., "System Simulation, Modeling and Languages", 1st Edition, PHI Learning Pvt. Ltd., India, 2013.

REFERENCE BOOKS:

1. Jerry Banks and John S. Carson, Barry L. Nelson and David M. Nicol, "Discrete Event System Simulation", 3rd Edition, Prentice Hall, India, 2002.
2. Narsingh Deo, "System Simulation with Digital Computer", 1st Edition, Prentice Hall, India, 2009.
3. Shannon R.E., "Systems Simulation: The art and science", Prentice Hall, 1998.

Course Outcomes:

On completion of the course the students will be able to

- define a strong foundation over the concept of simulation and modeling
- identify the techniques of random number generations and testing randomness
- apply the different probability distributions and random variants
- analyze the general purpose simulation system
- examine on simulation tools and impart knowledge on building simulation systems

14CSO03 BIO INSPIRED COMPUTING

3 0 0 3

Pre-requisites: Soft Computing

UNIT – I **9**

Evolutionary Systems: Foundations of evolutionary theory – Genotype – artificial evolution – genetic representations – initial population – fitness functions – selection and reproduction – genetic operators – evolutionary measures – evolutionary algorithms – evolutionary electronics

UNIT – II **9**

Cellular and Neural Systems: Cellular systems – cellular automata – modeling with cellular systems – other cellular systems – computation with cellular systems – artificial life - Biological nervous systems – artificial neural networks – neuron models - architecture – signal encoding – synaptic plasticity – unsupervised learning – supervised learning - reinforcement learning – evolution of neural networks

UNIT – III **9**

Developmental and Immune Systems: Rewriting systems – synthesis of developmental systems – evolutionary rewriting systems – evolutionary developmental programs Biological immune systems – lessons for artificial immune systems – algorithms and applications – shape space – negative selection algorithm – clonal selection algorithm

UNIT – IV **9**

Behavioral Systems: Behavior in cognitive science – behavior in AI – behavior based robotics – biological inspiration for robots – robots as biological models – robot learning – evolution of behavioral systems – learning in behavioral systems

UNIT – V **9**

Collective Systems: Biological self-organization – Particle Swarm Optimization (PSO) – ant colony optimization (ACO) – swarm robotics – co-evolutionary dynamics – artificial evolution of competing systems – artificial evolution of cooperation

TOTAL: 45

TEXT BOOKS:

1. Floreano D. and Mattiussi C., "Bio-Inspired Artificial Intelligence", MIT Press, 2008.
2. Neumann F. and Witt C., "Bioinspired Computation in Combinatorial Optimization: Algorithms and Their Computational Complexity", Springer, 2010.

REFERENCE BOOKS:

1. Elben A.E. and Smith J.E., "Introduction to Evolutionary Computing", Springer, 2010.
2. Goldberg D.E., "Genetic algorithms in search, optimization, and machine learning", Addison-Wesley, 1989.
3. Simon O. Haykin, "Neural Networks and Learning Machines", 3rd Edition, Prentice Hall, 2008.
4. Dorigo M. and Stutzle T., "Ant Colony Optimization", A Bradford Book, 2004.
5. R. C. Ebelhart, et al., "Swarm Intelligence", Morgan Kaufmann, 2001.

Course Outcomes:

On completion of the course the students will be able to

- implement and apply evolutionary algorithms
- explain cellular automata and artificial life
- narrate the characteristics of immune systems and apply them to computing
- relate behavioral science to robotics
- employ collective intelligence of biological systems to computing

14CSO04 IMAGE PROCESSING FOR COMPUTER VISION

3 0 0 3

UNIT– I **9**

Introduction: Digital image processing- Origin, Examples, Fundamental Steps, Components. Digital Image Fundamentals – Elements of Visual Perception, Light and Electromagnetic Spectrum, Image sensing and Acquisition, Image sampling and Quantization, Relationships between pixels, Mathematical tools.

UNIT – II **9**

Intensity Transformations and Spatial Filtering: Background, Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

UNIT-III **9**

Filtering in the Frequency Domain: Background, Preliminary Concepts, Sampling and the Fourier Transform of Sampled Functions, The Discrete Fourier Transform (DFT) of One Variable, Extension to Functions of Two Variables, Properties of the 2-D Discrete Fourier Transform, Basics of Filtering in the Frequency Domain, Image Smoothing Using Frequency Domain Filters, Image Sharpening Using Frequency Domain Filters, Selective Filtering.

UNIT-IV **9**

Color Image Processing, Wavelets and Multi resolution Processing: Color Image Processing: Color Fundamentals, Color Models, Pseudocolor Image Processing, Basics of Full-Color Image Processing, Color Transformations, Smoothing and Sharpening, Image Segmentation Based on Color, Noise in Color Images, Color Image Compression. Wavelets and Multiresolution Processing: Background, Multiresolution Expansions, Wavelet Transforms in One Dimension, The Fast Wavelet Transform, Wavelet Transforms in Two Dimensions, Wavelet Packets.

UNIT-V **9**

Image Segmentation: Fundamentals, Point, Line, and Edge Detection, Thresholding, Region-Based Segmentation, Segmentation Using Morphological Watersheds, Use of Motion in Segmentation, Object detection, Face recognition.

TOTAL: 45

TEXT BOOKS:

1. Rafael C. Gonzolez, Richard E. Woods, “Digital Image Processing”, 3rd Edition, Pearson Prentice Hall, 2008.

REFERENCE BOOKS:

1. Richard Szeliski, “Computer Vision: Algorithms and Applications”, Springer, 2010.
2. Sridhar S., “Digital Image Processing”, Second Edition, Oxford Higher Education, 2016.
3. Rafael C. Gonzolez, Richard E. Woods, Steven L. Eddins, “Digital Image Processing using MATLAB”, 2nd Edition, Gatesmark Publishing, 2009.
4. Jayaraman S., Essakirajan S., Veerakumar T., “Digital Image Processing”, Tata McGrawHill, 2009.

Course Outcomes:

On completion of the course the students will be able to

- explain the fundamentals and components of digital image processing
- develop techniques for image transformation and filtering
- apply Fourier Transforms for frequency domain analysis
- process color and multi resolution images
- apply the concept of image segmentation for computer vision applications

14CSO05 GREEN COMPUTING

3 0 0 3

UNIT – I **9**

Fundamentals: Green IT Fundamentals: Business, IT, and the Environment – Green IT Strategies: Drivers, Dimensions, and Goals – Environmentally Responsible Business: Policies, Practices, and Metrics.

UNIT – II **9**

Green Assets and Modeling: Buildings, Data Centers, Networks, and Devices – Green Business Process Management: Modeling, Optimization, and Collaboration – Green Enterprise Architecture – Environmental Intelligence – Green Supply Chains – Green Information Systems: Design and Development Models.

UNIT – III **9**

Green IT: Socio-cultural aspects of Green IT – Green Enterprise Transformation Roadmap – Telecommuting, teleconferencing and teleporting - Ten best ways to make your computer Greener.

UNIT – IV **9**

Green Compliance: Protocols, Standards, and Audits – Emergent Carbon Issues: Technologies and Future. The Environmentally Responsible Business Strategies (ERBS).

UNIT – V **9**

Case Studies: Case Study Scenarios for Trial Runs – Applying Green IT Strategies and Applications to a Hospital, Packaging Industry and Telecom Sector.

TOTAL: 45

TEXT BOOKS:

1. Bhuvan Unhelkar, "Green IT Strategies and Applications-Using Environmental Intelligence", Illustrated Edition, CRC Press, June 2011.
2. Woody Leonhard, Katherrine Murray, "Green Home computing for dummies", 1st Edition, Wiley Publication, August 2009.

REFERENCE BOOKS:

1. Alin Gales, Michael Schaefer, Mike Ebbers, "Green Data Center: steps for the Journey", Shoff/IBM Rebook, 2011.
2. John Lamb, "The Greening of IT", 1st Edition, Pearson Education, 2009.
3. Jason Harris, "Green Computing and Green IT- Best Practices on Regulations & Industry", www.lulu.com, 2008.
4. Carl speshocky, "Empowering Green Initiatives with IT", John Wiley & Sons, 2010.
5. Wu Chun Feng, "Green Computing: Large Scale Energy Efficiency", CRC Press, 2012.

Course Outcomes:

On completion of the course the students will be able to

- explain the concepts of technologies that conform to low power computation
- apply power efficient technologies for components of PC
- analyze the fundamental challenges in achieving green operations of computing units
- assess technologies applied in building a green system especially green data center
- apply green IT strategies for real time applications

14CSO06 BIOINFORMATICS

3 0 0 3

UNIT – I **9**

Introductory Concepts: The Central Dogma – The Killer Application – Parallel Universes – Watson's Definition – Top Down Versus Bottom up – Information Flow – Convergence – Databases – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks – Geographical Scope – Communication Models – Transmissions Technology – Protocols – Bandwidth – Topology – Hardware – Contents – Security – Ownership – Implementation – Management.

UNIT – II **9**

Search Engines and Data Visualization: The search process – Search Engine Technology – Searching and Information Theory – Computational methods – Search Engines and Knowledge Management – Data Visualization – sequence visualization – structure visualization – user Interface –Animation Versus simulation – General Purpose Technologies

UNIT – III **9**

Statistics and Data Mining: Statistical concepts – Microarrays – Imperfect Data –Quantifying Randomness – Data Analysis – Tool Selection - Statistics of Alignment – Clustering and Classification – Data Mining – Methods – Technology Overview – Infrastructure - Pattern Recognition and Discovery – Machine Learning – Text Mining – Tools.

UNIT – IV **9**

Pattern Matching: Fundamentals – Dot Matrix analysis – Substitution matrices –Dynamic Programming – Word methods – Bayesian methods – Multiple sequence alignment – Tools

UNIT – V **9**

Modeling and Simulation: Drug Discovery – Fundamentals – Protein structure – Systems Biology – Tools – Collaboration and Communications – standards – Issues

TOTAL: 45

TEXT BOOKS:

1. Bryan Bergeron, "Bio Informatics Computing", 2nd Edition, Pearson Education, 2003.

REFERENCE BOOKS:

1. Attwood T.K. and Perry Smith D.J., "Introduction to Bio Informatics", Longman Essen,1999.
2. Neil C.Jones, PaveA. Pevzner, "An Introduction to Bioinformatics Algorithms (Computational Molecular Biology)", MIT Press, 2004.

Course Outcomes:

On completion of the course the students will be able to

- describe the concepts of bioinformatics
- retrieve information's using various algorithms and techniques
- sequence the databases
- analyze the different pattern matching methods
- perform modeling and simulation

14CSO07 E-COMMERCE

3 0 0 3

UNIT – I **9**

E-Commerce Framework: Introduction – Electronic commerce framework – The anatomy of E-Commerce Applications. - The network infrastructure for E-Commerce- the Internet as a network infrastructure.

UNIT – II **9**

E-Commerce Systems and Applications: Electronic payment systems – Inter organizational Commerce and EDI - EDI Implementation - MIME and Value – Added networks.

UNIT – III **9**

Use of Advertising and Marketing: Advertising and marketing on the Internet – Intra organizational Electronic commerce. **Technologies:** Technological components of education on-Demand, Digital copy rights and Electronic commerce - Software agent – Internet protocol suite.

UNIT – IV **9**

Business documents and Digital Library: The Corporate digital library – Dimensions of internal electronics commerce systems - Making a business case for a document library - Types of digital documents- - Active / Compound document architecture.

UNIT – V **9**

Multimedia Systems: Multimedia and Digital Video - Broad band telecommunications – Mobile and wireless computing fundamentals.

TOTAL: 45

TEXT BOOKS:

1. Kalakota, Ravi and Whinston, Andrew B., "Frontiers of Electronic Commerce", Pearson Education, 2009.

REFERENCE BOOKS:

1. Loshin, Pete. And Murphy, Paul A., "Electronic Commerce", 4th Edition, Charles River Media, 2005.
2. Bajaj, Kamalesh K., "E-Commerce: The Cutting Edge & Business", 2nd Edition, Tata McGraw-Hill, 2003.
3. Kennan, Brenda, "Managing your E-Commerce Business", 2nd Edition, Prentice Hall of India, 2001.
4. Awad, Elias M., "Electronic Commerce from Vision to Fulfillment", 3rd Edition, Prentice Hall of India, 2003.

Course Outcomes:

On completion of the course the students will be able to

- describe the Frame work for E-Commerce
- examine the usage of Electronic Systems for payment processing
- apply the techniques for E-Commerce Advertising & Marketing in real world
- identify the business documents and Digital Library
- demonstrate the use of multimedia systems for E-Commerce

14CSO08 ESSENTIALS OF INFORMATION TECHNOLOGY

3 0 0 3

Pre-requisites: Problem Solving and Programming

UNIT – I **9**

Python: Introduction- Python data variables and operators-Control structures- Data structures- standard library- Functions.Regular expression- Modules and package-File operations- Exceptions and Error handling.

UNIT – II **9**

OO Approach and Data Structures: SDLC overview and Need for object oriented approach - UML – OO fundamentals Java implementations: OO fundamentals, Coding standards, methods.- Data structures: Linear data structures, Non- linear data structures.

UNIT – III **9**

Database Management System: Introduction - Database basics – RDBMS – Database design: Database life cycle, ER modeling, functional dependencies, normalization.

UNIT – IV **9**

SQL: Need for SQL- Types of SQL – Data types of SQL – Select statement with operators – Single row and Multi row functions – Group By and Having Clauses.

UNIT - V **9**

IUWT: Internet basics – Web fundamentals – HTML and CSS- Java script- **Software Engineering**: Basics of software Engineering – Models and Approaches – Requirement Development activities – Software design and construction- Software testing- Project categories and project management phases – Software quality.

TOTAL: 45

TEXT BOOKS:

1. Electronic Resources at http://campusconnect.infosys.com/

REFERENCE BOOKS:

1. www.learnpython.org
2. www.diveintopython3.net
3. http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-830-database-systems-fall-2010/lecture-notes/
4. http://www.htmlgoodies.com/primers/database/article.php/3478051
5. http://nptel.ac.in/courses.php

Course Outcomes:

On completion of the course the students will be able to

- express problem solving using algorithms and pseudo-codes
- demonstrate UML and OO concepts in Software Development
- apply SQL to create database queries
- develop web pages using the principles of User Interface and Web Technology
- categories various models and approaches in Software Engineering